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September 4, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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stainless steel is a family affair

There's more than just one type of stainless steel . because *stainless* applies to a family of steels. And order to get the best possible results from stainless your application, the right *analysis* must be used.

That's why Crucible, a pioneer in the development this specialty, offers you the services of an alert staff metallurgists to help you apply stainless steel to yo requirements.

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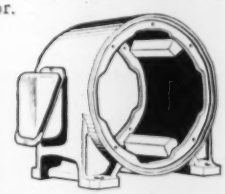
The Allis-Chalmers *SAFETY-CIRCLE* is the frame and ends of heavy cast iron that completely surround and protect the working parts of the *SAFETY-CIRCLE* motor.



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SAFETY-CIRCLE motors are fully protected inside, too. Multiple-dipped and multiple-baked stator plus extra inter-phase insulation provide extra protection against electrical breakdown.

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For complete details on *SAFETY-CIRCLE* advantages, see your A-C Authorized Dealer or Sales Office or write for Bulletin 51B6210B. Stocked in sizes 1 to 20 hp. *SAFETY-CIRCLE*, *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

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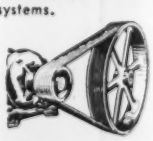

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Research keeps **B.F.Goodrich** *first in rubber*

"X-ray" of a grommet V belt— the belt that lasts 20 to 50% longer

Twin grommets found only in B. F. Goodrich V belts

YOU have to look inside a V belt to to see what gives you more belt service for your money. BFG engineers developed this "X-ray" demonstrator to show you the B. F. Goodrich grommet construction. A "belt" was made of a transparent, flexible material just so you can see the grommets.

Note the twin grommets—The two endless loops are grommets, the load-carrying section of the B. F. Goodrich grommet V belt. They're not ordinary cables, but are made by winding heavy cord on itself to make them endless.

All cords work—Placed close to the driving faces of the belt, grommets keep working close to the driving surfaces. This concentrates cord strength, all cords work, no cords overwork, the load is evenly distributed. In laboratory tests, B. F. Goodrich grommet V belts actually lasted 20 to 50% longer.

Greater flexibility—Twin grommets float in a bed of solid rubber. No plies of fabric, every part of the belt is equally flexible. Better grip, less slip. Size for size, grommet V belts give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Reduce belt failures—Most cord failures occur where cords overlap. But with an *endless* cord section in the grommet V belt, the cause of failures is eliminated.

No other V belt is a grommet V belt—The twin grommets are found only in V belts by B. F. Goodrich (U. S. Patent No. 2,233,294). It's a premium construction that costs you no more. D and E sections only.

See how the cause of most belt failures has been eliminated. Call your local BFG distributor. He has an "X-ray" demonstrator belt and will be glad to bring it around. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

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STAINLESS STEEL

COLD FORMING STAINLESS STEELS

The forming of stainless steel in most cases presents no special problems. Stainless requires somewhat greater power to form than plain carbon steel of the same gauge, but because of the superior strength and exceptional qualities of Stainless most parts formed are of a lighter gauge than those of carbon steel required to do the same job. Tools such as brakes, presses, etc., rated at a definite capacity for plain carbon steels are suitable for stainless steels 40% to 50% lighter.

For severe forming and extra-deep drawing austenitic steels are far superior to ordinary steels. The straight chromium grades of stainless steel have somewhat less ductility than the chromium-nickel grades, but can be used successfully. In general, the higher the nickel content of the steel the less tendency it has to work harden. For best forming qualities all stainless steels should be thoroughly annealed. Strains from severe drawing or spinning should be relieved immediately by annealing. The 302, or 18-8 Stainless can usually take a 40% reduction before annealing is necessary. The maximum reduction at which straight chromium steels can be drawn is about 25% to 30%.

Dies should be designed for greater springback allowance. Usually two to three times that of plain steel. Dies should have a higher finish because stainless steels have greater frictional qualities. Generally speaking bronze inserts are used to prevent scoring. Also stainless steels have different flowing characteristics than plain steel—which calls for greater clearance between punch and die. Too, drawing and spinning speeds should be cut down slightly. Proper lubrication is extremely important. Lubricants in liberal amounts are recommended especially for the deeper draws and spinning of heavier gauges. Cleaning is important. Failure to thoroughly clean parts prior to subsequent heating or annealing may result in pitting and carburization that would damage surface and lower corrosion resistance. After cleaning, parts should be handled with gloves or tongs to prevent smears or finger prints that could be burned into steel during annealing.

(This is the sixth of a series of reports on stainless steels that appear monthly in this column through the courtesy of the **Sharon Steel Corporation**.)

NEXT: SURFACE FINISHING.

Advertisement

Behind the Scenes . . .

The Latest Thing

Are you up on what's new technologically? STEEL's "New Products and Equipment" section which in this issue begins on page 107 helps you each week to keep up to date. Described in every issue are about 30 new products ranging from chemicals for melting snow to attachments for machine tools. More than 1500 new products are listed for your information every year in the pages of STEEL. Over the years the department has steadily expanded. It's now twice as large as it was a decade ago, and the range of products listed is much greater now.

Proprietor of the section is Assistant Editor Hank Holtz who, when he tackles his voluminous mail, sometimes thinks he's being confused with the U. S. Patent Commissioner. He uses most of the new product descriptions that cross his desk, although occasionally he gets one better suited for *Lingerie Merchandising* or Rube Goldberg.

Executives' Ills

We're hearing more and more about companies setting up formal plans for periodic physical examinations of their employees, particularly the executives.

And no wonder. A report from the National Industrial Conference Board reveals that of 500 industry officers examined by the Life Extension Examiners of New York 62 per cent had conditions requiring a doctor's attention. The average age of those executives was only 41.4, but several abnormal conditions were frequently found in the same person.

The "Too Fat" polka was the song most of them were singing, but hypertension, ulcers, cardiac conditions were not far behind on the hit parade of complaints. The conference board also finds that the psychiatrists are doing a lot of business with executives who can't sleep or are troubled with headaches and nervous stomachs.

For Forty Years

Coming up is the sixth edition of the *ABC of Iron & Steel*, a book on the fundametals of steelmaking that STEEL (or *Iron Trade Review* as it was named before the early 1930s) has put out for the past 40 years.

Way back before World War I, the editors invited outstanding authorities of the day to prepare articles on each phase of steelmaking. The series was presented first as a group of articles in *Iron Trade Review* beginning in 1911. Later they were edited for the first edition of *ABC*. The last of four revised editions that followed was published in 1925.

The sixth edition, edited by Associate Editor Dan Reebel, consists of 27 articles on steelmaking that ran in STEEL from Dec. 20, 1948, to Aug. 14, 1950. They have been assembled into a 440-page book that will be ready for sale late in September.

Kenneth B. Lewis, a consulting engineer with offices in Worcester, Mass., has the distinction of authoring the chapter on wire and wire products in all six editions. Other chapters in the book have been written by a newer crop of experts.

Many changes have taken place in the processing of steel since publication of the first edition. Crucible steel has disappeared. Most of the wrought iron plants are gone. Stainless steel has emerged as a tonnage product.

Puzzle Corner

The fly in the Aug. 21 puzzle walked 5 inches to get to the honey, not counting the thickness of the glass. First in with the correct answer were: M. S. Bailey, Machine Products Corp.; E. L. Sweet, Standard Gage Co. Inc.; Paul C. Smedley, Ohio Crankshaft Co.; T. S. Bean, Barber & Ross Co.; and Wayne F. Ridenour, Cheshire Mailing Machines Inc.

A guest took the 13 cards of a suit, held them in a pile in his hand, face down, and began to spell a-c-e. As he pronounced each letter, he took a card form the top of the pile and placed it on the bottom without looking at it. He turned up the next card. It was the ace, which he placed face up on the table. Then he spelled t-w-o, again turning up the next card, which was the two-spot. That also was placed face up on the table. He next spelled t-h-r-e-e, turning up the card following the second "e." He continued through to the king. Your assignment is this: Figure out the card arrangement.

Shrdlu

(Editorial Index—page 47)

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NEWS!

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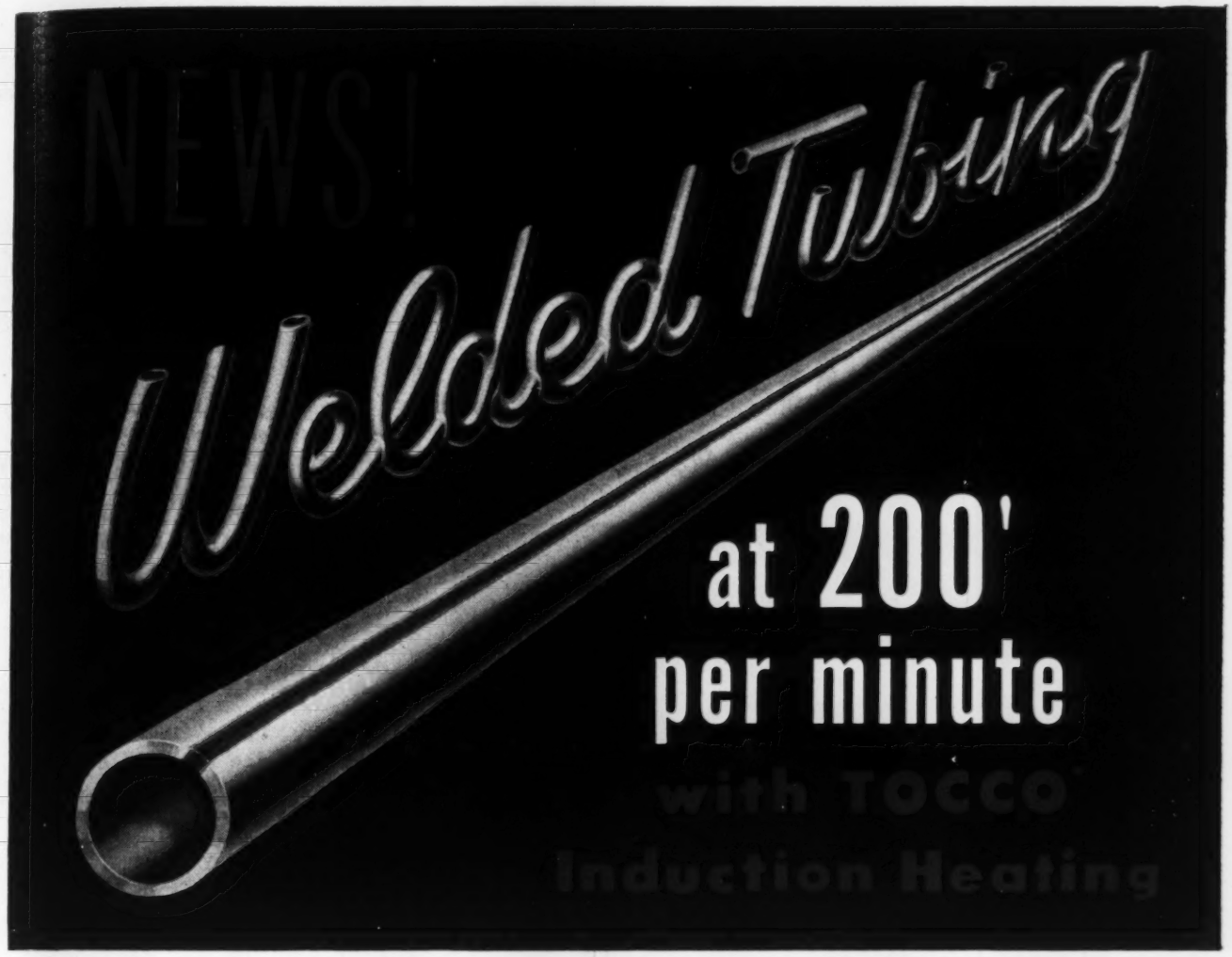
with TOCCO Induction Heating



Engineers at TOCCO and The Yoder Company pooled their know-how. Result!—induction welded tubing—a faster better method of tubing manufacture for all industry. Check these advantages.

- ✓ a production speed of 200′ per min.
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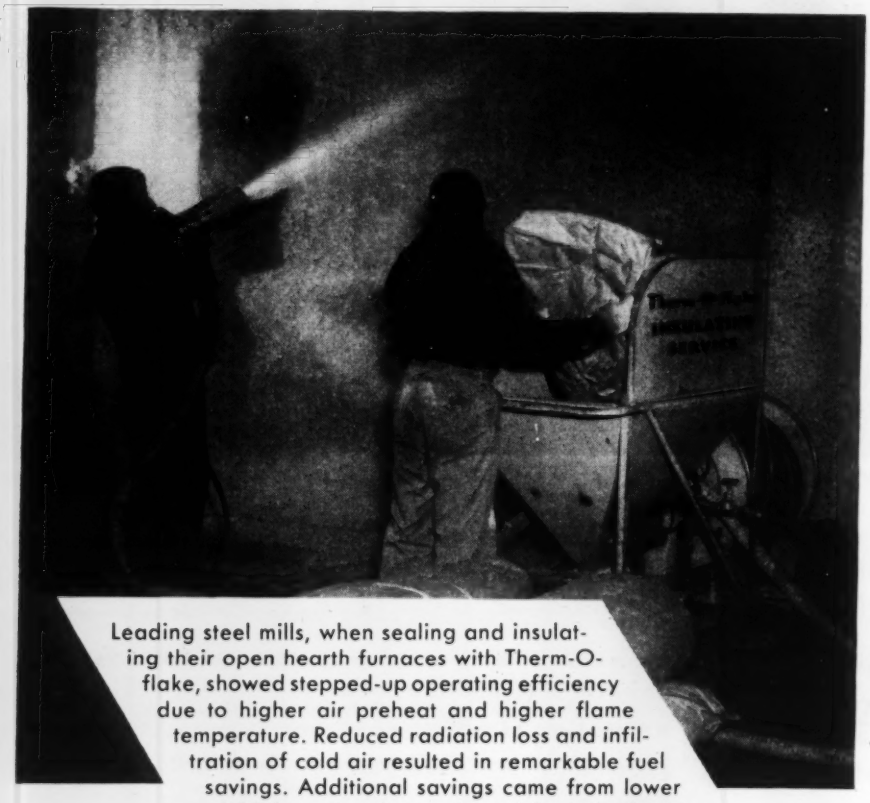
reduces fuel costs 6% to 15%



Leading steel mills, when sealing and insulating their open hearth furnaces with Therm-O-flake, showed stepped-up operating efficiency due to higher air preheat and higher flame temperature. Reduced radiation loss and infiltration of cold air resulted in remarkable fuel savings. Additional savings came from lower initial construction costs and from the longer life given furnace components.

Small in cost, light in weight, non-irritating and safe to use, Therm-O-flake can easily be blown into place by air pressure and withdrawn by suction. It'll pay you dividends to investigate the money-saving possibilities of using Therm-O-flake in your furnace installation—write for detailed information.

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LETTERS
TO THE EDITORS

Making Stainless Windows?

Who makes or is contemplating making a window from stainless steel? To my knowledge, there is only one stainless steel window in production.

Richard A. Biggs, Director, Architectural Development, Stainless Steel Division, Crucible Steel Co. of America

• *Perhaps makers or people considering making stainless steel windows can help Mr. Biggs.*

Efforts Rewarded

I was very glad to receive the DeSoto shop manual you sent me. To give you some idea of the extent I went to get this manual, I wrote to about 15 different sources since last November. I was surprised to hear from you even before the Chrysler Corp. Thanks again.

Henry Lulli
Long Island City, N. Y.

Get Your Ice Carpets Now

In one of your recent issues of STEEL you referred to "ice carpets" for automobile use, manufactured by Letraw Mfg. Co., Chicago. May we have this company's street address.

O. H. Persons, General Manager of Sales
Edgcomb Steel Co., Philadelphia, Pa.

• *Article entitled, "Knit Wire Finds New Applications", July 24 issue, page 65, tells of method of making ice carpets by this company, at 229 W. Illinois St., Chicago 10, Ill.*

STEEL Goes to Greece

Our Greek distributor has asked us to secure for him a copy of an article by D. Reebel entitled, "Revamped Production Facilities Boost Pipe Galvanizing 30 Per Cent" (STEEL, Feb. 20, 1950, page 84).

P. D. Dingwell, Export Sales
Gilbert & Barker Mfg. Co., W. Springfield, Mass.

Si Electrical Sheets

We would appreciate receiving a list of manufacturers of silicon electrical sheets.

I. R. Schaller, Purchasing Agent
Sylvania Electric Products Inc., Ipswich, Mass.

• *Following companies are among the producers of this type of steel: Wheeling Steel Corp., Wheeling, W. Va.; Allegheny Ludlum Steel Corp., Pittsburgh, Pa.; Granite City Steel Co., Granite City, Ill.; Inland Steel Co., Chicago, Ill.; Empire Steel Co., Mansfield, O.; Niles Rolling Mill Co., Niles, O.; Mahoning Valley Steel Co., Niles, O.; Follansbee Steel Corp.; Pittsburgh, Pa.; Carnegie-Illinois Steel Corp., Pittsburgh, Pa.; Republic Steel Corp., Cleveland, O.; Armco Steel Corp., Middletown, O.; Parkersburg Steel Co., Parkersburg, W. Va.; Newport Rolling Mill Co., Newport, Ky.*

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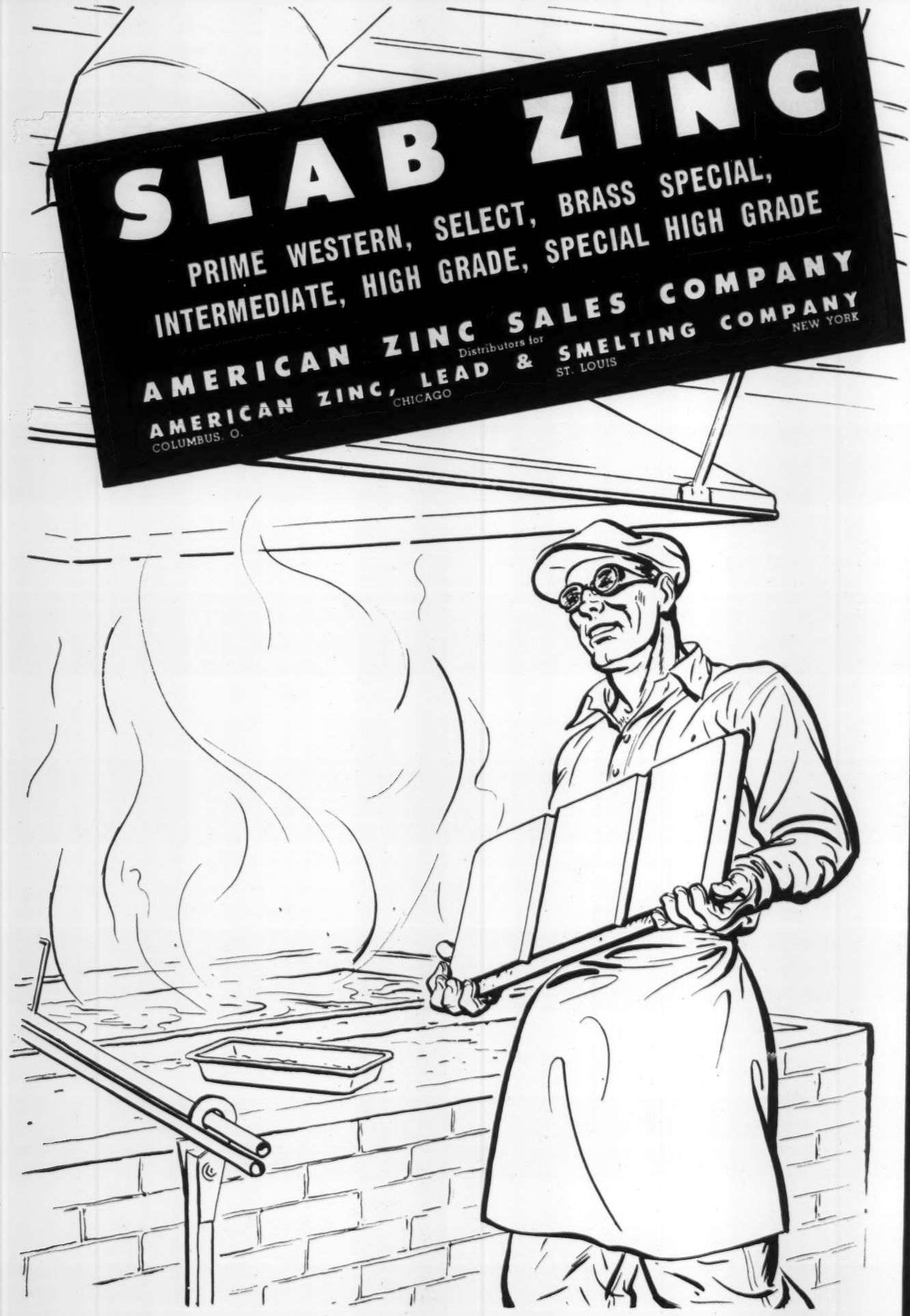

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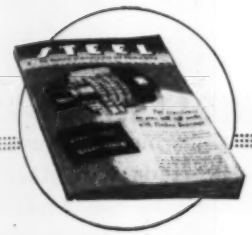

September 4, 1950

We Never Learn

About a decade ago we were exporting substantial tonnages of iron and steel scrap to Japan. We did it at the behest of our own government in accordance with its appeasement policy. Later we paid dearly for the mistake.

Today we seem to be repeating the prewar follies of World War II. In England Winston Churchill recently disclosed that a leading machine tool manufacturer is shipping machines to Russia and her satellites which could be used for tank production. The British manufacturer claims that for two years he has tried to get a statement from the Laborite government as to whether or not he should continue to ship the tools to the Soviets. He has received no instructions to cease shipping. The Labor government is in an embarrassing spot.

Last week Tell Berna, general manager of the National Machine Tool Builders' Association, charged that France, Italy and West Germany—all of whom are receiving aid from the United States through its Economic Cooperation Administration—are shipping machine tools to Russia. "In Italy," he declared, "ECA helped to finance machine tool production on behalf of postwar rehabilitation. But today more manufacturers of lathes and vertical drilling machines are there than in the United States. Why? Is the Russian market the answer?"

The question is pertinent because the United States cut off shipments of American-built machines and equipment to Russia and her satellites two and a half years ago. Machine tool builders have discussed the flow of tools from ECA countries to the Soviets with State and Commerce departments, National Security Resources Board and other agencies—"without result." Apparently our government is as complacent about these leaks to the Soviets as is Attlee's government in Britain.

Undoubtedly the difficulty goes back to our relations with Russia when she was our ally in World War II and to our failure in the postwar period to realize the true extent of Russia's unworthiness. Recently these mistakes have been recognized. Their implications are appalling.

Just as we reversed our policy of appeasement when South Korea was attacked, we now must correct the mistakes we have made in ECA. We need a definite policy in dealing with Russia and her satellites. The time is short.

* * *

WHO ENSLAVES LABOR? AFL and CIO union leaders are going all out to defeat Senator Robert A. Taft in his campaign for reelection next November. The sole basis for their opposition to him is that he is co-author of the Taft-Hartley act, which union spokesmen claim "enslaves" labor.

This charge is ridiculous. Unions have thrived under the Taft-Hartley act even more than under the Wagner act. The Taft-Hartley act really frees union members from some enslaving features of the Wagner act.

Last Tuesday Senator Taft paid a visit to a plant of Youngstown Sheet & Tube Co. A few CIO workers in a power plant struck, causing 1500 other employees to be idle for several hours. The excuse given for the walkout was that the men did not wish to be used as a "captive" audience for Mr. Taft. The Senator had not intended to speak. He visited the plant as planned.

This incident, coupled with cases wherein a number of union members have been ousted from their unions because they have campaigned actively for Taft, shows that the charge of slave

(OVER)

driving should be directed toward the union chiefs instead of toward the Taft-Hartley act.

A lot of union members are beginning to sour on the unfair tactics employed by union dictators in their anti-Taft campaign. Not all union members like to be treated as if they have no minds of their own. —p. 56

* * *

SHIFTS IN ALUMINUM: An interesting situation is developing in the drive for increasing aluminum ingot output and capacity. Production is approaching 2000 tons per day as compared with a wartime peak of 3000 tons daily in 1943-44. Annual capacity, which stands at about 747,000 tons today, will rise to 855,000 tons sometime next year.

One company will not share in this increase. Aluminum Co. of America is prevented from expanding its ingot capacity by the terms of a court decision. Alcoa's competitors will account for all of the increased facilities. Today Alcoa has 49.5 per cent of the nation's aluminum ingot capacity. About a year from now its percentage will drop to 43.3, that of Reynolds Metals Co. will decline from 30.1 to 28.4, Kaiser Aluminum & Chemical Corp. will move up from 20.4 to 24.1 per cent and Apex Smelting Co. and Harvey Machine Co. each will have 2.1 per cent. —p. 55

* * *

FORMULA TO AID YOU: Many readers have heard of the MAPI formula. It is a procedure developed by Machinery & Allied Products Institute to guide manufacturers in solving their equipment replacement problems. Gisholt Machine Co. is one company which has been using the MAPI formula advantageously. It employs a work sheet that takes into account the MAPI approach to re-equipment analysis, with some minor modifications.

The work sheet provides for information regarding all pertinent factors, such as superiority of product, increased output, salvage value, etc. Each factor is numbered and when you have filled out all of the 36 numbered questions, you arrive at a dollar figure which represents the net advantage or disadvantage of replacing your present equipment. If line 26 is less than line 35, replacement is premature. If line 26 is more than line 35, replacement is recommended.

Why not try the MAPI formula? It may help you to operate your plant more profitably. —p. 60

MORE DURABLE BOLTS: A new thread form has been developed which increases the endurance limit of bolts, studs and other threaded fasteners. It differs from the American National and British Whitworth profiles in that the root diameter and size of radius in the root of the thread are increased. These changes minimize the notch effect of the threads.

Fatigue tests show an endurance limit of 29,000 psi for the new high fatigue resistant thread form compared with 21,000 psi for American National fine thread and British Standard Whitworth forms and 18,000 psi for American National coarse thread form. More than 200,000 bolts with the new thread have been placed in severe service on New York subways. Breakage of the new type bolt when annealed is one-third and when cyanide hardened only one-eighth of that of American National coarse thread bolts in the same service. Bethlehem Steel Co. has applied for patent on manufacture of bolts with the new thread form. —p. 86

* * *

LEARN THE HARD WAY: Public ownership is losing favor in Great Britain. At the last election, closeness of the vote indicated that the British public was not overly enthusiastic about extending the nationalization program of the Labor party. Since then union labor has become somewhat disillusioned over the anticipated advantages of working for government-owned businesses. The Trades Union Council has found that it is as difficult to deal with public employers as with private ones. Discussion of the Schuman plan also has created new doubts about the desirability of turning over private businesses to the government.

Even prominent members of the Labor party are retreating from nationalization. R. W. G. Mackay shocked his party associates by admitting that prosperity in Britain is due "not so much to the successful application of socialist principles in Great Britain as the successful working of capitalism in the United States."

After all, experience still is a pretty good teacher! —p. 66

E. C. Shaner

EDITOR-IN-CHIEF

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News Summary

FATTER PAY— The Korean round of wage hikes is upon us. You'll be doing well if you can settle with your union for less than 10 cents an hour. As usual, the auto industry has set the pattern. GM announced a 5-cent-an-hour increase because of the cost-of-living clause in its contract. That added to an earlier 4-cent rise means a 9-cent pay boost has been granted this year (p. 70). Chrysler's unexpected 10-cent rise solidified the pattern. Spurred by the threat of wage controls, all unions will lose no time in taking their cue from the UAW. From their viewpoint, the timing is ideal. They can point to a price rise as justification, but they're really winning increases because of the pyschological climate fostered by the Korean war.

THINNER AIR— The consumers' price index climbed to 172.5 for the month ended July 15, the highest rate since October, 1948 (p. 72). Count on further increases that by the end of the year may put the general price level 5 per cent higher than now. Auto builders say they'll try to hold the line, but don't bet on their success.

NEW ALPHABET— You'll be increasingly familiar with NPA by the end of September (p. 55). The new National Production Authority will be starting to function by then in administering the priorities and allocations, under the Defense Production Act of 1950. Opinion in the Commerce Department, which will have NPA under its wing, is that no severe allocations will be necessary for the time being. NPA's role for a while may be to fashion stand-by plans in case the Korean war gets worse.

MORE ALUMINUM— Supply difficulties should be easing a little in aluminum because ingot production is climbing to about 2000 tons per day, the highest level since 1943-44 (p. 55). New capacity will be operating in a year that should relieve the scarcity still more. Annual capacity is about 747,000 tons now, but it will increase to 855,000 tons.

AS CLEAR AS MUD— When President Truman vetoed the O'Mahoney freight absorption bill, he said he did so because the present laws and FTC policy statements "made it quite clear that there is no bar to freight absorption or delivered prices as such." In a reply to a Senate questionnaire requesting an FTC policy statement on the subject, FTC Chairman James M. Mead says, in effect: No blanket assurances can be given that practices involving freight absorption will meet all legal tests (p. 62). So, you're still in this dilemma: Absorb freight and hope that you won't get sued or don't absorb freight and hope that your competitors won't get the jump on you . . . Some steel users in the Muskegon, Mich., area think they have a solution that will get around the problem (p. 57). They want to participate in a steel freight pool whereby many small steel orders are consolidated into large consignments and shipped via water.

NEW POWDERED IRON— A new type of iron powder is coming on the market that may help you (p. 58). Powdered Iron Corp., Detroit, is making it on a small scale. It resembles Swedish sponge iron physically, but has the purity of the best electrolytic iron powder.

THE TUNE CHANGES— European socialists, including Britons, are easing up on nationalization (p. 66). Public ownership is no longer so popular with the voters. Even British unionists find that public owners are no easier to deal with than private. The British Labor party promises not to take over any more entire industries. Continental socialists are now leaning more to privately owned industry in which the workers have more voice in management.

HERE AND THERE IN INDUSTRY— Gisholt Machine Co. has summarized and condensed the MAPI formula to help you set up a scientific approach to equipment analysis (p. 60) . . . Tell Berna, general manager of National Machine Tool Builders' Association, charges that machine tool builders in ECA countries are shipping equipment to the Reds (p. 56) . . . Sharon Steel Corp. is going to roll titanium sheets (p. 57).

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STEEL
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U.S. Blueprints Controls Agency

Commerce Department fashions new National Production Authority to administer priorities and allocations under the Defense Production Act of 1950

IN WORLD WAR II Washington chefs dipped into their alphabet soup to get WPB; in the postwar period they dipped to find OIC; now they come up with NPA as the agency to administer priorities and allocations, under the Defense Production Act of 1950.

The Commerce Department is blueprinting the organizational setup of the National Production Authority that will begin functioning at least limitedly by the end of September.

The Soup Gets Cold—Top administrators of NPA have already been picked, and last week some were on the job at the new Commerce Department agency even before the production act had been passed and the President had signed it. Other personnel appointments and confirmations will come more slowly, chiefly because of the tedious but necessary process of loyalty checks. It may be several months before NPA is functioning to the hilt.

NPA director, with the title of undersecretary of commerce, will be Maj. Gen. William Henry Harrison, an executive in the War Production Board in World War II, director of procurement for the Army Service Forces in that war and now president of International Telephone & Telegraph Co. (STEEL, Aug. 28, p. 46). In Washington as General Harrison's representative in the organizational phase of NPA is George Wilde, New England banker. Mr. Wilde served under General Harrison in the WPB and later in the Army Signal Corps. Also in Washington is Manly Fleischmann, Buffalo attorney, who served as assistant general counsel of WPB. He'll be NPA's general counsel.

Rich in Iron?—One of the first tasks of NPA will be to call in officials of companies that produce the scarce materials—now generally considered to be steel products, titanium and cadmium. From these talks will come the decisions on what will be allocated and how much.

General Harrison is also expected to recruit more of his personnel after those sessions. When he finds what's to be done, he'll probably ask steel and other companies affected to nominate men from their ranks to join NPA.

Appetizer—To get NPA off to a flying start, Director H. B. McCoy, Office of Industry & Commerce, has put his Commerce Department unit to work to get pertinent information on commodities. Watch for a questionnaire from his organization asking about your inventories. Government procurement agencies are also reporting to him on what they need for the next 12 months.

What Mr. McCoy and later General Harrison will eventually come up with is anybody's guess, but Commerce officials feel there is no general need for allocations. A mere 5 million tons of steel for the armed services in the next 12 months, they reason, will not throw industry into a tailspin.

The Service Is Uncertain—One school of thought in Washington is of the "Let George do it" persuasion as to how allocations should be applied. It says: Tell the producers what the government needs; then let the producers figure out how to ration their remaining output among non-government customers. That was about how the Office of Industry Cooperation functioned after World War II.

"You stay out of the soup more easily that way," a government official says.

Aluminum Output Climbs

Production mounts as the U.S. sells facilities and private expansions increase

PRODUCTION of aluminum ingots is climbing to about 2000 tons per day, the highest level since 1943-44 when output reached 3000 tons. The rate will be even closer to the wartime peak sometime next year when total annual aluminum ingot capacity will increase to 855,000 tons. It's about 747,000 tons now.

Increased water supplies account for the rising production now; sale of government facilities and plant expansions promise to boost output still further. Ample water this year has hiked hydroelectric plants' generation of power that many alu-

BLITZ OPERATION: Production of 5-gallon gasoline containers—blitz cans—that the armed forces used in World War II is being increased by Nesco Inc., Milwaukee, to meet an order for 539,000 cans. Quartermaster placed the order. Nesco completed an order for 332,000 containers in July. The two orders are valued at more than $1.7 million. Granite City Steel Co., Granite City, Ill., will expedite steel shipments to Nesco, which will deliver cans under the new order at a 150,000-per-month rate

minum pot lines must rely on.

All But One—Additional aluminum ingot capacity will be furnished by Kaiser Aluminum & Chemical Corp., Reynolds Metals Co., Apex Smelting Co. and Harvey Machine Co. Aluminum Co. of America is prevented from expanding its ingot capacity under the terms of a court decision. The government has just sold or will sell most of the rest of its aluminum-producing equipment, to augment the ingot capacity by about 300 tons daily. Two idle federal plants at Riverbank, Calif., and Burlington, N. J., will be stripped.

Much of the equipment will go to two new ingot producers in the industry—Apex and Harvey—who will emerge with an annual ingot capacity of 16,000 tons each. That's equivalent to production of one pot line for each firm. The Apex plant will be in Oklahoma, the Harvey unit in Montana. Reynolds is scheduled to increase its capacity by another 18,000 tons annually in Arkansas, and Kaiser by 54,000 tons with a new plant at Pomeroy, O., which includes equipment rated at 36,000 tons' annual capacity to be acquired from the government.

Jockeying for Position—A year from now Alcoa's percentage of the industry's capacity will drop to 43.3. It's 49.5 per cent now. Reynolds will decline from 30.1 to 28.4 per cent despite the planned boost in production. Kaiser will move up from 20.4 to 24.1 per cent. Apex and Harvey will each have 2.1 per cent.

Pipe Institute Sets Priorities

Cast Iron Pressure Pipe Institute is establishing a voluntary priority system that will give preference to military requirements. Members of the industry have advised the military that the supplier will require telegraphic or written statement from a responsible military official stating the urgency for the procurement of the material needed.

Members of the institute are: Alabama Pipe Co., American Cast Iron Pipe Co., James B. Clow & Sons, National Cast Iron Pipe Division of Clow, Florence Pipe Foundry & Machine Co., Glamorgan Pipe & Foundry Co., Lynchburg Foundry Co., McWane Cast Iron Pipe Co., Pacific States Cast Iron Pipe Co., United States Pipe & Foundry Co. and Warren Foundry & Pipe Corp.

Harvester To Build Army Unit

Department of Defense has asked International Harvester Co. to undertake production of a new Army Ordnance armored utility vehicle of the track-laying type, to be used as a personnel carrier. The Melrose Park, Ill., works will build the vehicle for the Army.

In a letter order, Harvester was authorized to proceed immediately with the procurement of machines and necessary equipment. Prices and terms, production and delivery schedules will be negotiated later when a definitive contract will be drawn up.

Harvester will build a new plant in Melrose Park to be used in connection with the order. Some 1500 new employees will also be required to produce the vehicles.

The company's industrial power division engineering staff has been working on design of the vehicle since the close of World War II under a government research and development contract.

Taft Comes in, Workers Go Out

Members of the United Steelworkers said, "We won't play," and walked off their jobs last Tuesday when Sen.

Scram boys! Here comes Taft

Robert A. Taft (Rep., O.) paid Youngstown Sheet & Tube Co.'s Campbell plant a visit.

The walkout began in the boiler house and blooming mill soon after 8 a. m. Lack of steam caused by the boiler room walkout soon spread its effect to several finishing mill departments where an estimated 1500 men were idled. Normal operations were restored by 4 p. m.

James P. Griffin, director of District 26, United Steelworkers of America, said "the stoppage was occasioned by the membership's resentment at being used as captive audiences for Senator Taft."

The senator was not scheduled to speak. He did not postpone his visit.

GM Buys Plant for Tank Parts

General Motors Corp. bought the former Stinson Aircraft Co. plant and airport on VanBorn road near Wayner road in Romulus township near Detroit. The plant, which was owned by Air Fleets Inc. since the war, will be operated by Detroit Diesel Engine Division of GM for the manufacture of auxiliary generators to be used in the tanks that will be built by Cadillac in Cleveland.

The 24,000-square foot plant is located on a 153-acre plot, part of which was once used as an airport by Stinson. W. T. Crowe, general manager of Detroit Diesel, says it will take some time to recondition the plant and tool it for the production of generator sets. He estimates original employment will be about 500. Present plans call for production to start in February.

Reds Get Machine Tools

NMTBA executive charges that ECA countries are selling tools to Russia and her satellites

MACHINE tool plants in Western Germany financed by the aid of ECA are selling machine tools to Russian satellite countries, charges Tell Berna, general manager of the National Machine Tool Builders' Association, Cleveland.

Commenting on Winston Churchill's disclosure that England is selling machine tools to Russia, Mr. Berna says that's only part of the story. "France, Italy and West Germany are also shipping machine tools to Russia or satellites. All these countries are getting ECA aid."

Why the Capacity?—"In Italy, ECA helped to finance machine tool production on behalf of postwar rehabilitation. But today more manufacturers of lathes and vertical drilling machines are there than in the U. S. Why?" asks Mr. Berna. "Is the Russian market the answer?

"In West Germany, where the revival of the machine tool industry is part of the recovery program financed by American taxpayers' money, machine tools are being built for shipment to Russian satellites under permit from the American military authorities. In Offenbach horizontal boring mills are being built for shipment to Poland, and in Frankfurt, way grinders are being built for shipment to Hungary."

No Sense—The NMTBA manager points out that the U. S. cut off shipments of American-built machine tools to Russia or satellites some

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VISITING FIREMEN'S ENGINE: A passenger version of the Yale freightmaster —a battery-powered load carrier—is specially designed to scoot distinguished guests, stockholders, open-house guests or even the boss' friends through industrial plants. Thinking of the thousands of feet of aisle space in their own plants, many visitors to the Philadelphia division of Yale & Towne became interested in the vehicle. What was once a peripatetic ordeal is now a pleasurable jaunt for many who got on the wagon

two and a half years ago. The State Department recently even held up the export of American-built machine tools to Italy, France and Sweden on the ground that the products made on those machines might go to Russia. "The picture does not make a bit of sense," says Mr. Berna.

"We have discussed it time and time again with the Departments of State and Commerce, the National Security Resources Board and various heads of the Armed Forces—without result."

Shipping Pool Plan May Cut Transportation Costs

STEEL users and a freight forwarding firm in the Muskegon, Mich., area have hit upon a shipping pool scheme that may offset rising transportation costs and put the metalworking plants in a better competitive position.

Freight was not a major problem in Muskegon when the basing point system of pricing steel was being used.

Then, the Michigan companies got most of their steel from Cleveland, Buffalo and Pittsburgh on an f.o.b. Detroit basis. But since the abandonment of basing point, they've had to pay their own truck and rail freight bills, usually on material brought from Chicago. Competitors in or near Chicago and other steel centers have been a jump ahead because of lower steel transportation charges.

By Water—The proposed pooling deal would enable the Michigan consumers to get most of their steel via cheap water transportation from Detroit, Cleveland and Buffalo. Hearings on the proposal are scheduled before the Interstate Commerce Commission for Sept. 18 at Grand Rapids. About 600,000 tons of steel and several hundred thousand tons of pig iron are used yearly in the Muskegon area.

Ralph S. McCrea, president and treasurer of Midwest Forwarding Co., proposes to do this: Consolidate Muskegon area orders on the docks of steel producers in Cleveland, Buffalo and Detroit; load at producers' docks at their expense and with their facilities; ship the consolidated orders to the docks of Midwest Importing Co., a firm affiliated with Midwest Forwarding, where they would be forwarded to the steel users; store the steel in some instances at the Midwest Importing warehouse for smaller consumers who have seasonal requirements.

Combination Bill — Midwest Forwarding will pay all transportation costs and bill its customers. The company proposes to publish tariffs which will be a combination of rates of presently established certified carriers by water, a terminal charge that includes unloading at the Muskegon dock and the forwarding companies' fee, plus rail or truck rate to consumer.

The terminal charge will be an estimated 75 cents to $1 per ton, depending upon the commodity.

Mills Resist Scrap Rises

Buyers seek stabilization at $44 a ton for No. 1 steel at Pittsburgh and Valley points

SCRAP price stabilization at a lower level than has prevailed recently may result from growing mill resistance to rising prices.

This resistance last week caused a drop of $2 per ton to $44 on No. 1 heavy melting steel at Pittsburgh. Prices at several other market centers declined in sympathy with the easing at Pittsburgh.

Scrap prices have risen steadily since the outbreak of the Korean war in face of fairly comfortable mill inventories and impending large imports of material. As a result, normal market relationships among grades and among consuming districts have become distorted.

Ceiling: $44 — In an attempt to correct these distortions the steel mills are reported to be refusing to pay more than $44 Pittsburgh and Valley points for No. 1 steel, and $10 to $12 per ton less for blast furnace grades. Prices at other districts are to be established below Pittsburgh and the Valley to the extent of freight involved. For example, Detroit scrap would take the Valley price minus freight.

May Compromise on Freight—For the most part it is believed the scrap trade will welcome stabilization. But whether prices at points other than the Valley and Pittsburgh will decline to the extent suggested is uncertain.

Here is an example: A Pittsburgh-Valley price of $44 less freight would reduce the Chicago price to $36, and mills in that area presently are willing to pay $40. Establishment of a Chicago differential of $1.50 per ton is likely.

July Pig Iron Output at Peak

The nation's blast furnaces turned out 5,878,945 net tons of pig iron, ferromanganese and spiegeleisen in July for an alltime record.

The peak output compares with 5,633,451 tons in June and 4,173,311 tons in July, 1949. For the first seven months of the year, 37,012,384 tons were produced, and the industry is well on the way to equaling or

topping the record production year of 1944 when 62,072,683 tons were turned out.

Frick Expands Coal Capacity

H. C. Frick Coke Co., coal mining subsidiary of U. S. Steel, will open a 4000-ton a day coal mine in Washington county, Pa., and another mine of the same capacity, closed since 1928, will be reopened in Fayette county, Pa.

The new mine will be developed between Vestaburt and Fredericktown. Its coal will start coming in 1952 when it will be used by Carnegie-Illinois Steel Corp.'s by-product coke plant at Clairton, Pa.

The closed Collier mine near Uniontown, Pa., will be ready in about a year's time. All of the coal mined there will be coked in the adjacent beehive ovens.

Sharon in Titanium Sheets

The company may carry on titanium operations at Farrell, Pa., and Niles and Warren, O.

SHARON Steel Corp., Sharon, Pa., is joining the ranks of steel companies going into the titanium sheet business. The company has completed preliminary test rolling of titanium sheets at its Niles, O., subsidiary, Niles Rolling Mill Co.

Sharon thinks the test marked the first time that titanium sheets were rolled on mills normally used for rolling steel sheet. Niles will make a limited quantity of titanium sheet available to certain potential users. The principal applications of titanium in the near term are expected to be in military aircraft, for airframes, jet engine parts and for armor. Right now titanium is being sold in sheet, strip, bars, tubing, wire and forgings—mostly for military requirements.

Sharon is thinking about carrying on further titanium operations at its plants at Farrell, Pa., and possibly at Brainard Steel Co., Warren, O., another subsidiary. Although metallurgists hesitate to predict how great the tonnages of titanium will be in the future, many think it will be our next major light metal. Titanium ore is plentiful.

Because of the many possible military uses for the metal, the early use of titanium for peacetime purposes is not very likely. Its favorable strength-weight ratio and resistance to corrosion makes it look like a good bet for applications to transportation equipment and in the marine and chemical industries.

Iron Powder Developed

Powdered Iron Corp. is producing a new type on a pilot plant scale for industry

A NEW type of iron powder for the powder metallurgy field is being produced by Powdered Iron Corp., Detroit, on a pilot plant scale for industry. The powder resembles Swedish sponge iron physically, but has the purity of the best electrolytic iron powder.

Good Combine—The combination of particle shape typical of sponge iron and high purity gives these advantages, says the manufacturer:

1. Compacts are more easily made. The dendritic structure causes interlocking of the particles at usual working pressures, while the softness of the iron itself permits the forming of a dense compact upon increasing the pressure.

2. Sintering temperature seems to be somewhat lower. Temperatures of the order of 1300 F and up produce good results, as compared with the 1500-1800°F commonly used.

3. Particles size is more uniform. Particle size is controlled in the original production of the material, instead of in the reduction of a larger mass by mechanical means.

4. Electrical properties are improved. Powdered iron cores of electrical and electronic applications show lower hysteresis and eddy current losses, due to the lower density of the compact when produced for core purposes.

Cast Iron or Scrap—Ordinary cast iron or mild steel scrap in the form of borings or turnings is the raw material used in the process. It is placed in a chemical bath in iron trays, and becomes the anode in the electrolytic reaction. The iron is dissolved chemically and is deposited from the solution in a mercury cathode that becomes impregnated with the iron. The iron is recovered in fine particle form by distillation of the cathode, soft pulverizing and air classification.

There is no severe mechanical reduction of a large mass, so that the dendritic structure of the powder as obtained from the cathode is not destroyed.

The Shape Tells—Particle shape of the material can be translated into greater green strength in compacts, due to the interlocking of the particles, or into greater compressibility of the powder, due to the readiness with which the dendritic structure can be compacted. Thus usable compacts can be made with low apparent density. The powder as supplied commercially has an apparent density of 2.4 to 2.5, but it can be supplied in apparent densities as low as 1.6 or as high as 2.8.

High purity is obtained by the process because there is no residual of unreduced oxide, as in sponge processes. Purity of the final powder is about 99.8% iron. Absence of silica means avoiding the abrasive effect of this substance during compacting. The powder is priced competitively with standard iron powders now on the market.

More To Come—Patents have been applied for to cover the new features of the manufacturing process. While a limited commercial production is now available from the pilot plant, additional facilities shortly will be completed to increase capacity considerably.

The new material is expected to find many fields of application for which present iron powders are suitable. It should have speoial advantages where a high-purity material is needed for low-density compacts, as in electronic work, the producers say.

Wide World

NOTHING TO IT: Karl P. Billner, left, inventor of a new cargo lifter, explains the workings of the round vacuum holders on the lifter to E. G. Van Es of the Navy's Bureau of Yards & Docks. The holders — about one foot in diameter—attach themselves automatically to the object to be lifted. Each holder has a lifting capacity of 900 pounds. The entire lifter used in the demonstration at the railroad yards of the Pennsylvania Railroad in Philadelphia had a capacity of upwards of 26,000 pounds.

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Pilot Output at Budd

Though the Chase plant in Gary is not yet complete, expansion plans are in the cards

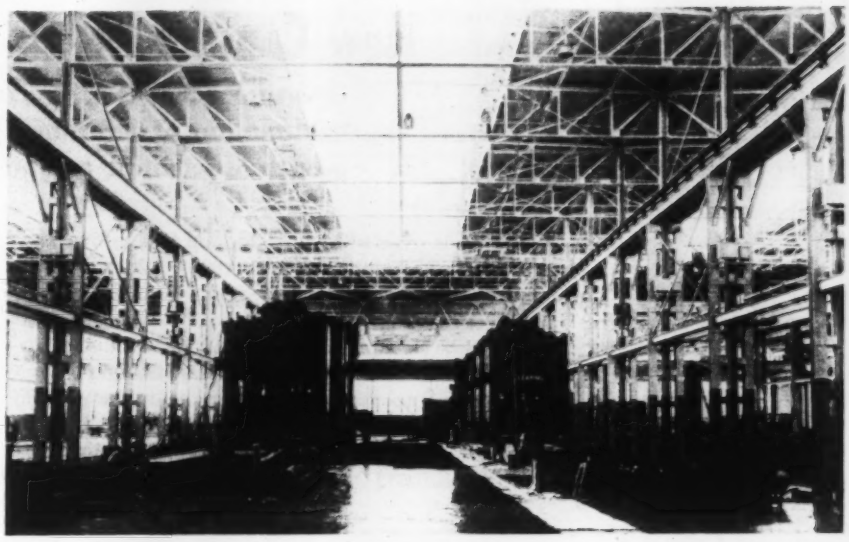
PILOT production of automotive parts was begun last week by Budd Co. at its new Chase plant in Gary, Ind.

Materials are just starting to flow through the only partially completed facility, but the plant's officials are already making expansion plans envisioning an operation that will dwarf what was originally contemplated.

Edwin F. Bates, Chase plant manager, unruffled by the fact that he is doing his work on a plywood board supported by sawhorses, is hopeful that the Gary plant will some day have a million square feet of floor space. At present 300,000 square feet of manufacturing space is included.

The Once Over—Despite the plant's incompleteness an "open house" was held recently for the people of Gary. Purpose: "To let them see us and vice versa." A labor force of upwards of 1200 is being recruited and 5000 applications for employment have already been received.

The main building contains two major sections—stamping department and assembly space. In the stamping section twelve presses are in various stages of readiness. Soon this department will contain 43 presses, and more are expected to be added to that total. One of 12 presses already installed is a unit weighing 400 tons, built by Clearing Machine Corp. It is described by Budd people as the largest triple-action press in the world. It also has the longest stroke. They say the press can handle any size stamped component part automotive industry will need. About 60 per cent of the plant's machinery is on order or already delivered. As yet no machinery for the assembly area has been installed.



A MILLION SQUARE FEET OF FLOOR SPACE SOME DAY?
. . . at present a 300,000-square foot manufacturing area

McLouth Declares Stock Dividend

A stock dividend of one share of unissued capital stock for each share now outstanding has been declared by directors of McLouth Steel Corp., Detroit. Certificates will be mailed about Sept. 29 to holders of record on Sept. 15.

Ivor Bryn, vice president of operations, has been elected to the McLouth board of directors.

Kennecott Starts Copper Plant

Kennecott Copper Corp. is taking preliminary steps to get its new $16 million refinery at Garfield, Utah, in operation.

The new plant will provide 700 to 800 new jobs. Most of the workers will be hired locally and trained on the job. Capacity at the outset will be 12,000 tons of refined copper per month cast as wire bars, ingots and ingot bars.

Bennett Goes All Out for Clifton

Another machine tool business joins the trend to suburban locations: Bennett Machinery Co.—for 27 years it was located in the heart of downtown New York—started construction of a new office adjoining its plant in Clifton, N. J. where it will move sometime this fall.

Says Letcher W. Bennett, president: "We see increased efficiency and certain economies in combining office and plant in industrial northern New Jersey. . . . There will be many advantages for our employees . . . greater convenience for customers who will need to make only a 20-minute trip from midtown Manhattan to inspect machinery and hold conferences."

Low-Alloy Steel at 3 Mills

Bethlehem Pacific Coast Steel Corp. says that low-alloy, high-strength Mayari-R steel is being produced at its three plants—in Seattle, South San Francisco and Los Angeles. It is being rolled in all sizes within the range of each mill. Besides the steel's combination of greater strength and increased corrosion resistance, it can readily be fabricated and welded by all ordinary methods, says Henry Hewitt, vice president in charge of sales for the company.

Quimby Pumps Sold to Warren

Quimby Pump Division of H. K. Porter Co. Inc. was sold to Warren Steam Pump Co. Inc. T. M. Evans, Porter's president, made the announcement. Porter is withdrawing from the manufacture of screw pumps, a relatively small business, to devote more of its time to its other lines. Its other lines: Oil field equipment, locomotives, heat exchangers, pressure vessels, etc.

Warren will handle the servicing of Quimby pumps.

Coral Designs on Long Island

Coral Designs Division of Henry G. Dietz Co., formerly located at Forest Hills, N. Y., is operating in its new expanded quarters at 12-16 Astoria Blvd., Long Island City, N. Y. The facilities will be used for production of the division's standard line of electronic, electrical and mechanical controls. It is also equipped to handle development work in the electronic field on a contract basis. Facilities include all the necessary equipment to produce prototypes and small scale production of specialized electronic equipment.

Rockwell's V & O Press Sold

V & O Press Division of Rockwell Mfg. Co. was bought by Hartford-Empire Co., Hartford, Conn. The Hudson, N. Y., plant will continue under the management of Herman F. Zorn. No personnel changes are contemplated.

Electric Furnace at Watertown

New York Air Brake Co. installed a modern electric furnace unit in its

plant at Watertown, N. Y. The furnace is capable of producing high-grade material for use in the gray iron foundry industry.

Company Scours Europe for Steel

Seidelhuber Iron & Bronze Works Inc. is sending a representative to Europe to get more steel. The maker of hot water heaters and tanks says its general manager, Frank V. Seidelhuber Jr., has begun a two-month trip to Great Britain and Europe to line up steel suppliers.

Machine Tool Survey in L.A.

A survey of machine tools in southern California's 4000 metalworking plants is being made by the Los Angeles county chamber of commerce. Its purpose is to provide the armed forces' procurement officers with detailed information about the 56,000 machine tools that are believed to be located in Los Angeles county. A similar survey was undertaken in 1941, prior to World War II.

Associations Change Address

For the past 41 years the Fernley family has had offices at 505 Arch St., Philadelphia. When the city, state and federal governments started a project that will involve demolition of three city blocks in front of Independence Hall in the City of Brotherly Love, George A. Fernley, a professional trade association man, decided it was high time to buy a bigger and better building for his offices.

As of Sept. 11, his new offices will be at 1900 Arch St., Philadelphia 3. Among the associations he serves in such capacities as executive secretary, advisory secretary or managing director are: American Machine Tool Distributors' Association, Resistance Welders Manufacturers Association, National Wholesale Hardware Association and National Welding Supply Association. The phone number is LOcust 4-3484.

Hartzell Breaks Ground

Ground was broken for a $100,000 addition to the Hartzell propeller fan plant in Piqua, O., says Robert N. Hartzell, president of Hartzell Industries Inc. The new addition will about double the capacity of the present plant and will enable operations to be concentrated under one roof. The company manufactures fans and blowers from 6 inches to 22 feet in diameter in 3600 models.

How Can the MAPI Formula Help You?

Gisholt Machine Co. evolves a work sheet and a condensed explanation of Machinery & Allied Products Institute's approach to scientific equipment analysis

WHAT is the MAPI formula? There's been much talk about it (STEEL, May 8, p. 56, Aug. 21, p. 70), but what does it do?

Machinery & Allied Products Institute evolved a scientific approach to re-equipment analysis that is becoming a bible for companies that want to keep on top technologically and save money besides. The institute's *Dynamic Equipment Policy* explains the approach in detail. The *MAPI Replacement Manual* is the condensed version of the first book. Both are for sale by MAPI, 120 S. LaSalle St., Chicago 3, Ill.

Helping Hand — Gisholt Machine Co. is one firm using the MAPI formula. The work sheet at the right is its adaptation of the approach to re-equipment analysis. This sheet is no substitute for the *MAPI Replacement Manual.* It is designed as a handy reference and a condensed summary of the MAPI formula. Gisholt has made some minor modifications in the MAPI approach to simplify your work.

The work sheet should contain complete reference information on the equipment being studied. Present equipment should cover the actual machine or machines now in operation. Proposed equipment should refer to a specific proposal or quotation. The section on the "Analysis of the Job" is a projection for next year. Standard business practice is to estimate a year in advance on sales, costs and production.

By the Numbers—The listings in the analysis of the job are all benefits and as such are the cash differences in the operating costs. Most values will be listed in the "proposed" column only. Where factors are equal there will be no listings. Where the present equipment has the advantage, the listings will be made only in the "present" column.

> MACHINERY & Allied Products Institute says:
>
> "No live industry can keep abreast of technology without continuous renewal and transformation of its productive facilities. Existing equipment must be kept on the defensive, compelled always to justify its tenure against the challenge of currently available alternatives. If it fails to meet the challenge, it must be displaced regardless of its age or condition."

1. Superiority of Product—Will replacement make possible the use of new material, a better design or give greater performance in the product? If so, put down what it is worth.

2. Increased Output—Here, estimate the net additional profit from the increased production the proposed equipment will make available.

3. Other Product Factors—If the proposed equipment would permit you to make a wider range of parts or have some other definite effect on business, each of these items should have a cash value.

Savings in direct labor, indirect labor, fringe benefit costs, maintenance, supplies, tools, spoilage, down time, floor space, power and property taxes and insurance should be entered in the next 11 spaces of the work sheet. Conditions not accounted for in the first 14 spaces should be indicated in No. 15.

16. Total Operating Advantage—Add the "analysis of the job" figures for each column and place them here.

17. Net Advantage of Proposed Equipment—This is the "proposed total" (B) less the "present total" (A).

Now you have the complete story of the job itself, but that's not enough. Even machines that are standing idle have a fixed cost. Consider now the fixed costs in the "Analysis of the Equipment" section. To get fixed costs, handle the old and the new equipment separately. Note that the section above the line on the work sheet is merely the gathering of the useful information. The second section below the line will contain the dollar values on which you will make your final decision to buy or not to buy. Consider first your present equipment.

18. Salvage Value, Now — That would normally be the figure at which you can sell it second hand, as is. A used machinery dealer can quote you a price.

19. Salvage Value, Next Year—Estimate what you could get for the equipment a year from now.

20. Loss Salvage Value, Next Year—That's the difference between line 18 and line 19.

21. Interest, Salvage Value—If you decide not to replace the machine,

EQUIPMENT REPLACEMENT ANALYSIS

(As Determined by the MAPI Formula)

EQUIPMENT UNDER CONSIDERATION

PRESENT EQUIPMENT	PROPOSED EQUIPMENT
Builder	Manufacturer
Model	Model
Year	Proposal No.
Serial No.	Estimate No.
Location	Date of Proposal

ANALYSIS OF THE JOB
(MAPI — "Operating Advantage — Next Year")

FACTOR	PRESENT	PROPOSED
(1) Superiority of Product	$	$
(2) Increased Output		
(3) Other Product Factors		
(4) Direct Labor		
(5) Indirect Labor		
(6) Fringe Benefit Costs		
(7) Maintenance		
(8) Supplies		
(9) Tools		
(10) Spoilage		
(11) Down Time		
(12) Floor Space		
(13) Power		
(14) Property Taxes & Insurance		
(15) Other Manufacturing Factors		
(16) TOTAL OPERATING ADVANTAGES	$ (A)	$ (B)
(17) *Net Operating Advantage of PROPOSED Equipment (B-A)	$	

ANALYSIS OF THE EQUIPMENT
(MAPI — "Adverse Minimums")

PRESENT EQUIPMENT		PROPOSED EQUIPMENT	
(18) Salvage Value — Now	$	(27) Cost Installed	$
(19) Salvage Value — Next Year		(28) Service Life	Yrs.
(20) Loss Salvage Val. — Next Year	$	(29) Salvage Value	$
(20) Loss Salvage Val. — Next Year	$	(30) Salvage Ratio	%
(21) Interest — Salvage Val.		(27) Cost Installed (D)	$
(22) Proration — Cap. Addition		(31) Chart %	
(23) Interest — Cap. Addition		(32) Interest %	
(24) Annual Fixed Cost	$	(33) Total % (E)	
(25) * Net Opertg. Disadvantage		(34) Annual Fixed Cost (D x E)	
(26) Annual Operating Cost (C)	$	**(35) Annual Operating Cost (F)**	$
(36) **GAIN FROM REPLACEMENT NEXT YEAR (C — F)**			$

Signed ____ Date ____

you are passing up that amount of income. Charge yourself interest on that investment. That figure is usually 10 per cent of line 18.

22. Proration, Capital Addition—If your equipment must be repaired or rebuilt to continue in service, estimate a figure to cover the cost. By prorating the figure over the number of years of expected additional life, you will have the annual cost for this capital addition.

23. Interest, Capital Addition—Since this capital addition must be spent now you must again charge yourself interest on the investment. The figure is usually 10 per cent of the total cost of the rebuilding or repairing.

24. Annual Fixed Cost—This is the total of cost-plus-interest for continuing to use your present equipment.

25. Net Operating Disadvantage—Use the figure from line 17. If you don't take advantage of the net operating advantage for next year, it becomes a disadvantage and is chargeable against your present equipment.

26. Annual Operating Cost (C)—This is the sum of line 24 and line 25. It's the projected cost of keeping your present equipment in service for another year.

Now turn to proposed equipment.

27. Cost Installed (D)—This is the quotation total, plus shipping and installation charges.

28. Service Life—This is the length of time the machine will stay on the job before some new machine can replace it. It's often figured as 10 years.

29. Salvage Value—What do you estimate you could get for the machine after using it the number of years entered on line 28?

30. Salvage Ratio—Divide line 29 by line 27. Percentage goes here.

31. Chart the Percentage—Use the MAPI chart at the bottom of this page. Vertical axis is in terms of percentage and the horizontal axis in terms of service life. At the bottom of the chart, start at the figure representing service life (line 28). Run up to your salvage ratio (line 30) which will be read between the curves and the figures in the center of the chart. After establishing the approximate location, you read the equivalent on the vertical axis.

32. Interest Percentage—List the same percentage figure you used in computing the interest in line 21.

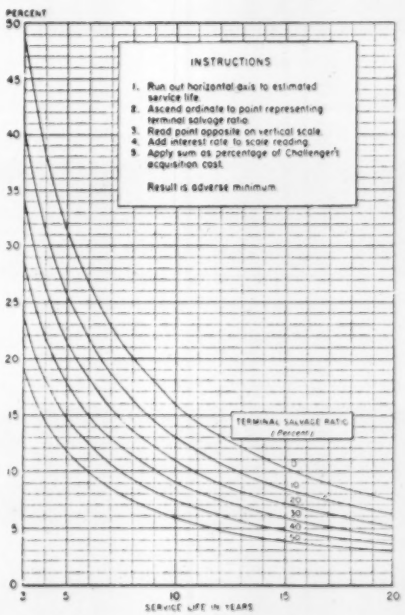
33. Total Percentage—The figure is the total of your chart percentage (line 31) and your interest percentage (line 32).

34. Annual Fixed Cost (D × E)—Multiply your cost installed (line 27) by your total percentage (line 33). The final figure is your average annual cost of owning the proposed equipment.

35. Annual Operating Cost (F)—This is the "adverse minimum" of the MAPI formula. Since the net operating advantage of the proposed equipment (line 17) has already been charged to the present equipment, your only costs are that of owning the new equipment. This is the same figure used in line 34. (D × E = F).

36. Gain from Replacement, Next Year (C − F)—This is the annual dollar advantage of replacement. If the figure in line 26 is less than the figure in line 35, replacement is premature. If line 26 is greater than line 35, replacement is recommended.

Gisholt's work sheet can be used for any type of machine, not just machine tools alone. Gisholt, Madison 10, Wis., will furnish copies without charge. Anyone wanting to reproduce it for use in his own plant may do so.



Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Freight Absorption Picture—Who Can Interpret It?

In the light of FTC Chairman Mead's replies to Johnson committee questions about delivered pricing, you may well wonder whether you are not in peril when you absorb freight

A SHELL GAME has nothing on the game that is being played with the serious business of absorbing freight. *Now you see it, now you don't* might well describe the way businessmen size up the rhubarb that was started when the Supreme Court handed down its decision against the cement manufacturers a little more than two years ago.

Right now the matter of freight absorption is in a "now you don't see it" phase. So don't base your marketing and pricing plans on the assurances given by President Truman in June when he vetoed the O'Mahoney freight absorption bill. That's about the only sound conclusion you can draw from the replies of James M. Mead, Federal Trade Commission chairman, to a questionnaire from the watchdog committee (STEEL, June 26, p. 43) created by Sen. Edwin C. Johnson (Dem., Colo.).

The Right Tree?—The committee has been barking up the FTC tree on the matter of freight absorption for some time now. It finally got a statement from FTC after the President's veto of Senator O'Mahoney's bill.

In his veto message the President said: "Recent court decisions and Federal Trade Commission policy statements have made it quite clear that there is no bar to freight absorption or delivered prices as such. . . . I recognize that businessmen have been concerned lest they be penalized for perfectly sensible and appropriate competitive action. I believe their concern is unwarranted. . . . Still further clarification of the antitrust laws can be expected when decisions are reached in a number of cases now under consideration by FTC and the courts."

Tenor of Chairman Mead's replies to the Johnson committee questionnaire (Mr. Mead spoke on behalf of three of the four commissioners) was:

Yes, the views of the President accord with the present views of the Federal Trade Commission, but no blanket assurances can be given that practices involving freight absorption would meet all legal tests.

The views expressed by Mr. Mead in a written statement and at a Johnson committee hearing make it clear that the legal status of freight absorption is still as muddled as in the past.

Questions & Answers—The commission, said Mr. Mead, has authority "to proceed only against conduct that constitutes an unfair method of competition or injures competition." Quoting of delivered prices is perfectly legal when that practice does not injure competition. But delivered prices are illegal when they result in discrimination. Only by considering all factors involved in a particular case, says he, can a determination be reached as to whether delivered prices, or any other method of pricing, involve illegal discrimination.

Mr. Mead cited certain practices that the commission would not disapprove. Is freight absorption permissible on a continuous basis, or only occasionally? Answer: If no unlawful purpose or effect is present, a pricing practice is lawful no matter how frequently engaged in.

When one seller adopts a pricing practice, may others also adopt this practice—provided all act independently and in absence of conspiracy, combination and agreement? Answer: With each person acting independently, and in the absence of conspiracy, combination and agreement, the situation would not be unlawful.

May an employer authorize salesmen to meet delivered prices of more favorably located competitors, or must salesmen get specific authorization in each case? Answer: There is nothing illegal about such blanket authority, provided no discrimination results.

At Your Peril—These answers, though, are less significant and helpful than indicated on their face, for Mr. Mead made it clear that the governing factor is whether there has been, or will be, price discrimination, with resulting injury to competition. Since there is no general understanding, even in the commission, as to the criteria necessary to prove illegal price discrimination, Mr. Mead's overall statement seems to warrant the conclusion that freight absorbers and delivered price quoters are acting at their peril.

Commissioner Lowell Mason, who for some years has labored vainly to swing the commission from strict legalism to a more practical point of view, was the dissenter. If the commission agrees with the veto observations of the President, said Mr. Mason, it will have to admit to past errors and avoid their repetition in the future. "If the commission agrees with the President's most cogent observations, what will it do with the Corn Products and Staley cases which hold that basing point and delivered pricing practices resulted in varying mill nets that, therefore, were unlawful under the Clayton Act?" asks he.

No Rip-Snorter This

The report on the steel hearings held by the Celler Monopoly Subcom-

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mittee, House Judiciary Committee, in April and early May, will not be the rip-snorter that was indicated by advance notices of the evidence the subcommittee expected to uncover in the hearings. Instead, it will be of a strictly "factual" character, summing up the facts disclosed by the statements and responses of United States Steel Corp. executives. The report will not attempt to make a specific case against the Steel Corporation, but will view the evidence in the Steel Corporation hearings in the light of monopoly problems existing in industry generally in the United States. The subcommittee hopes to have the report ready for release late in September or early in October.

Plowman: Military Traffic Head

When Defense Secretary Louis Johnson instituted a unified traffic service to be known as Military Traffic Service (MTS) two weeks ago, he chose a man who had been trafficking with the transportation business for a long time. The man was E. G. Plowman who is the first MTS director. Plowman is a vice president of U. S. Steel, a position he has held since 1944. His services were made available to Defense by U. S. Steel on a loan basis. Mr. Plowman was chief of the Transportation Section, Steel Division, War Production Board from 1942 to 1943; he was traffic consultant to the chairman of WPB in 1945.

A central office manned primarily by civilians is to be established and located in Washington.

More Brass Hats as Speakers

You can expect to see and hear more military brass hats at future conventions as a result of a policy definition by Defense Secretary Louis Johnson. The policy not only assures officers that they are on safe ground when they take part in the activities of service-connected civilian industrial associations, but encourages them to do so.

"In view of the urgent requirement for service-industry team work," says the Johnson directive, "it is recommended that all services be encouraged to participate in all relationships with these organizations that may be mutually beneficial. Service representation at these meetings, conferences, etc., is especially desirable in promoting good will and in affording business leaders and executives, and service officials, an opportunity for mutual exchange of ideas. . . . No restrictions are to be imposed on direct dealings between the services and the organizations in technical and proceurement matters."

The Defense Department's Office of Public Information was ordered to give all possible assistance in carrying out this policy, and will set up a new National Organizations Branch for this purpose. Besides setting up suitable publicity, it will be the duty of the branch to respond to invitations, to furnish speakers when desired, and make assignments to the right officers.

Titanium Alloy Tests OK'd

Two Navy Bureau of Aeronautics test programs involving use of titanium alloy in new jet planes were concluded satisfactorily; approval was given for actual production of engine firewalls and tailpipe shrouds from the alloy. Test runs on turbine compressor blades, turbine compressor disks and engines built of titanium alloy continue. The alloy involved is 5 per cent chromium, 3 per cent aluminum, and 92 per cent titanium, reported by BuAer to be "substantially as strong as high-strength steel but only half as heavy, highly resistant to corrosion, and retains its basic properties at high temperatures." Use of the alloy is contemplated for all parts "where strength at high temperatures is of major importance."

Mail Course in Management

Interested in taking a correspondence course on "Emergency Management of the National Economy?" If so, request information from the Commandant, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington 25, Attention Correspondence Study Branch. The course is for the benefit of those unable to attend classes. Its purpose is to provide background information on how a war emergency affects the national economy and of the measures that must be adopted to prevent bottlenecks. Originally laid out for regular and reserve officers of the three armed services, the course has proved valuable to many steel and other industrial executives. The correspondence course is open to "500 qualified civilians aged 30 to 50."

Move To Institute New Patent Policy Sidetracked

WHEN IT WAS ISSUED last Jan. 23, it didn't appear to many that executive order No. 10096 was intended as a measure for broadcasting inventions made by private industry while working under government contract.

Seemingly the purpose of the order (it had been drafted by the Justice Department) was the establishment of a uniform government patent policy on inventions made by government employees and the creation of a Government Patents Board to administer the policy.

But concealed in otherwise inoffensive language was a provision under which the board was to include contractor-owned inventions among those it was to tell the public.

Therein & Thereof—The joker read: ". . . all inventions or rights therein, including licenses, owned or controlled by the United States or any government agency, shall be indexed, and copies, summaries, analyses and abstracts thereof shall be maintained and made available to all government agencies and to public libraries, universities, trade associations, scientists and scientific groups, industrial and commercial organizations, and all other interested groups of persons."

The policy, if it had been carried out as specified in the joker, would have jeopardized contractor's rights to the inventions made by them while working under government contracts.

Rhubarb—When Dr. Archie M. Palmer was appointed chairman of the new Government Patents Board in June, he at once encountered objections on the ground that the President's order was intended to cover policy in relation to inventions made by government employees, and that the provision giving the board authority to publicize contractor-owned inventions obviously was extraneous matter. Another objection was that the validity of the order as a whole is open to question in view of Supreme Court decisions that patent policy may be declared only by Congress and that no power to declare patent policy is vested in the administrative branch. Procurement agencies say they have no legal right to furnish to the board the invention disclosures they receive from contractors; they hold that they are in the same position as the Patent Office which is prohibited by statute from disclosing anything in pending patent applications.

Socialists Ease Up on Nationalization

Politics, popular dissatisfaction and the Schuman plan are making European advocates of public ownership of industry—even Britons—sing in a minor key

EUROPEAN socialists — even the British Laborites—are changing their tune about nationalization. Political expediency, popular dissatisfaction and the Schuman plan all are contributing toward a more moderate viewpoint.

British Labor for the time being won't take over any more entire industries. It may still take over individual companies or even set up its own corporation to compete with others in an industry. That means that most steelmen in the United Kingdom can breathe more easily for a while. A final decision on steel —and on the whole nationalization policy—will come after the next general election.

Strategic Retreat — The Laborites changed their song because: The outcome of the last election indicated that nationalization is going sour as a political issue; public ownership is being criticized increasingly even by party members; the Trades Union Council is cooler toward nationalization because it finds public owners as difficult to deal with as private; big segments of the British economy—transport, electricity, gas, most of civil aviation, coal and the Bank of England—already have been taken over.

The Laborites were hit a body blow when a prominent party member, R. W. G. Mackay, admitted that prosperity in Britain is due "not so much to the successful application of socialist principles in Great Britain as the successful working of capitalism in the United States."

A Rift in the Ranks—Debate on the Schuman plan brought a shift in the position of Continental socialists on nationalization. They parted company with the British on public ownership when the island Laborites rejected the plan to pool the steel and coal resources of Europe because of this reasoning: International economic co-operation is impossible without nationalized industries first. Few continental industries are nationalized or even have much chance to be soon. Therefore, successful international economic pooling arrangements are impossible now.

Andre Philip, one of the more radical of the French socialists, challenges the idea that a successful Schuman plan must be built on nationalized industries. He even denies that nationalization is a keystone of the socialist idea. He criticizes the bureaucracy in the British style of public ownership and points out that some degree of nationalization characterized the regimes of Hitler and Mussolini, as well as of Stalin. Mr. Philip thinks that an acceptably socialized industry would be a privately owned industry in which the workers have some voice in management.

Britain Expands Steel Capacity

The new $7 million billet and sheet bar mill at the Scunthorpe works of John Lysaght Ltd. went into production for the first time on Aug. 20. The mill, which took three years to build and install, is 1050 feet long and 175 feet wide. It has a flying shear capable of cutting steel within limits of 9 and 30 feet.

Britain's new $8.8 billion defense program, plus increased demand for steel products from the U. S., will keep that mill and every other steel facility in the country going at full tilt for months to come. One of the biggest defense orders thus far let has been awarded to Austin Motor Co. Ltd. for military truck bodies. One of the largest orders from the ing $5.6 million with Stewarts & Lloyds Ltd. to supply steel pipe to American oil and natural gas companies. Standard Oil Co. of New Jersey placed the largest order.

Great Britain will build 3000 jets to reinforce its fighter command.

More than $140 million worth of contracts have been let with De Haviland and Gloucester airplane companies for Meteor and Vampire jets.

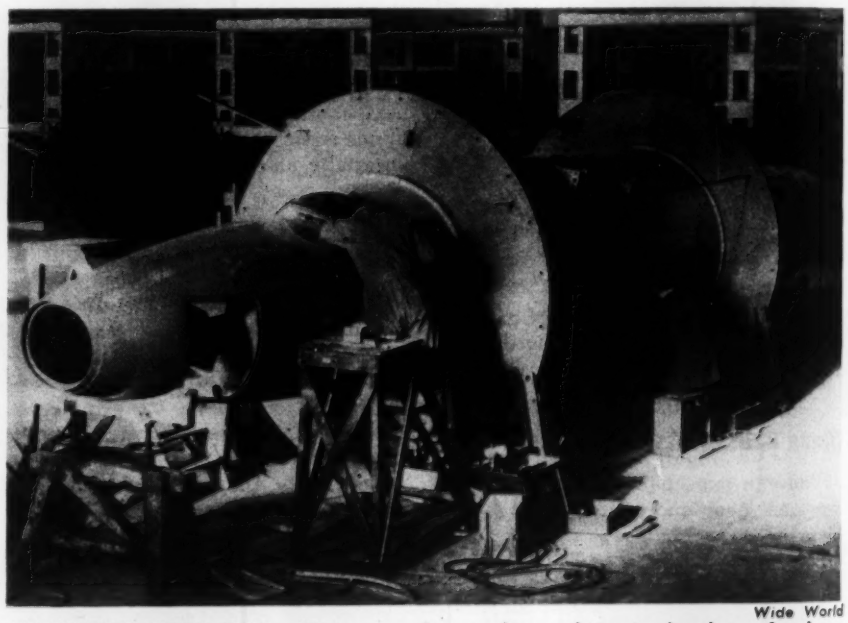
France To Spend for Arms

France has voted a $5715 million armament program. Unused government-owned armament capacity will be brought back into production, and a financing program is being considered to help private firms re-equip for war production.

The industrial pace is breathtaking; unemployment dropped to less than 54,000. French steelmen are negotiating to ship 150,000 tons of the metal to the U. S. On Sept. 1 France started shipping some 200,000 tons of pig iron and semifinished steel to Switzerland. Swiss are stockpiling for defense.

French iron and steel exports, exclusive of scrap, in the first half totaled 1,342,000 net tons, an 82 per cent increase over the shipments in the first six months of 1949. Exports for the year may reach a record 3 million tons.

A sign of inflation in France is this: The Bank of France has issued banknotes of 5000 and 10,000 franc denominations. The latter will be the



Wide World

"TURNING" THEM OUT: The men who work on this attack plane fuselage in a London aircraft plant are running rings around their former production records. The fuselage is fitted into encircling wooden rings and a frame equipped with rollers, enabling the fuselage to be rotated into any position

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first of this denomination ever to be put in circulation in France. A 5000 franc note was in circulation for a short time after the war.

French production is rising, as well as prices. Passenger car output is now 66 per cent above what it was before the war. Truck assemblies are 150 per cent higher.

The French merchant marine is now larger and more efficient than the prewar fleet although 66 per cent of the French merchant ships were destroyed in World War II.

Germans Try a New Tack

The Germans are trying a new tack to get the Allies to boost the steel production ceiling from the present limit of 12.2 million net tons yearly. Ruhr steelmen say they'll make everything over that available to U. S. purchasers. The nation is producing now at an annual rate of about 14.8 million tons.

One American firm has unsuccessfully tried to order 300,000 tons of rolled steel in Germany, offering up to $120 per metric ton for plates, compared with an average export price of $60 only a few months ago. Steel bars and structurals are going at $75 to $80 per metric ton. Sheets take at least 10 months for delivery, and prices are from $115 to $135. Belgian steel plants are sold out until March, 1951. French deliveries are shorter.

The Germans also want production ceilings lifted on aluminum. The Allies now limit the output to 94,000 tons annually. American and other foreign firms have contracted for 100,000 tons, pending Allied approval. Three German plants would fill the order by processing bauxite imported from Greece.

Dutch Plate Mill Started

Breedband Co. has started construction on its new $23.5 million plate mill at Ymuiden, Netherlands. The plant will raise Holland's plate capacity from 150,000 tons to 225,000 tons annually. Marshall Plan aid is helping to finance the project.

Spanish Mill Planned

The steel plant to be built in Asturias, Spain, by the National Institute for Industry, a government-sponsored group, will consist of three blast furnaces, a battery of coke ovens, a large tilting open hearth and other smaller ones and rolling mills. Production will consist of heavy rails, plates and sheets.

The initial output will be an estimated 220,000 tons per year, to be increased to 660,000 tons in 10 years.

General Hershey To Speak

"Guideposts to Industrial Operations in the Present Crisis" is the theme of the 51st annual convention of the National Metal Trades Congress. It will be held at the Hotel Commodore, New York, Sept. 27-29. Thomas J. Morton Jr., who made the announcement, thinks attendance will break previous records.

Says he: "This will be an up-to-the-minute program keyed to meet the needs of management in a crisis economy. Because of the rapidity of developments, the association will not hesitate to adjust the schedule of subjects to provide speakers competent to discuss new topics that may have an immediate bearing on industrial operations."

Maj. Gen. Lewis B. Hershey, director of selective service, will address the 2000 who are expected to attend the convention. His subject: "Selective Service in the Current Crisis."

AISI Holds Regional Meetings

American Iron & Steel Institute will hold its 1950 series of regional technical meetings in Pittsburgh on Oct. 11, Birmingham on Oct. 25, San Francisco on Nov. 10 and Chicago on Dec. 1.

The programs have been varied to present subjects which may prove of especial interest to those members and companies located in the areas where the meetings are to be held.

Gas Appliances on Display

More than 170 manufacturers of gas appliances will display their products in Atlantic City, N. J., Oct. 2-6, as part of the American Gas Association's annual convention and show. The exhibition will cover 70,000 square feet of floor space.

January Plant Maintenance Show

The Plant Maintenance Show, which drew industrial executives from 35 states and many foreign countries when it was conducted for the first time early this year, will be held again in Cleveland Auditorium, Jan. 15-18. Clapp & Poliak Inc., New York, the exposition management made the announcement.

Present indications are that it will be two or three times the size of the first show. Already 120 companies have leased booth space that exceeds the total area used for the first show 61 per cent.

Galvanizers Meet Oct. 4-6

The American Hot Dip Galvanizers Association Inc. will hold its 1950 semiannual meeting at the Greenbrier Hotel in White Sulphur Springs, W. Va. on Oct. 4-6. Several members of a British team of galvanizers from the Hot Dip Galvanizers Association of England will attend.

Society Awards Prizes

Steel Founders' Society of America is starting an awards program; $1000 in cash prizes will be offered for technical papers dealing with new designs, redesigned steel castings, conversions and advanced uses for steel castings, including improved materials and methods applications to meet specific engineering problems.

In all, 15 awards include a top prize of $300 for the paper judged most useful, two additional awards of $200 and $100 each, fourth others of $50 each and eight $25 awards. The program is open to all persons except employees of Steel Founders' Society of America, Cleveland, and of companies which are members of the society. Closing date for the competition is Dec. 1, 1950.

Eutectic Holding $1000 Contest

R. D. Wasserman, president of Eutectic Welding Alloys Corp., New York, annouces his company's sponsorship of a $1000 prize competition for technical papers dealing with research and development on "non-fusion" welding processes.

The contest opened Sept. 1, 1950; it closes May 31, 1951. Three prizes will be awarded: First, $500; second, $300; and third, $200. Rules about the competition can be had from Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

5 Million Cylinder Liners

Campbell, Wyant & Cannon Foundry Co. reports that its 5 millionth cylinder liner came off its production lines at Muskegon, Mich. All of the liners—an average of a million a year—were centrifugally cast in the No. 6 plant which opened in 1945.

Campbell, Wyant & Cannon manufactures the liners and sleeves in all sizes, weighing from several pounds each (for outboard motor engines and other small internal combustion engines) up to several hundred pounds each (for marine diesel equipment, railroad locomotive engines and various other types of engines). They are made in a wide variety of specifications. In the other company plants various other types of castings are produced in volume. Among them: Cylinder heads and blocks, pistons, camshafts, crankshafts, gears, Centrifuse brake drums.

SEVEN STRONG REASONS

Appreciation of its many advantages explains the trend to N-A-X HIGH-TENSILE steel by manufacturers of commercial vehicles.

- HIGH STRENGTH
- HIGH FATIGUE RESISTANCE
- GOOD FORMABILITY
- FINER GRAIN STRUCTURE
- GREAT IMPACT TOUGHNESS
- EXCELLENT WELDABILITY
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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Kaiser-Frazer is cashing in on the car buying boom and should have a profit for this year. Daily assemblies near 1000. The Henry J will be unveiled Sept. 29

DETROIT

FORTUNES of Kaiser-Frazer are rebounding as second-shift operations gain strength and daily assemblies approach the 1000 figure. Officials report the company once more in black ink, and given the solid market which all automotive forecasters are predicting, the K-F year will wind up on the profit side.

Output for August was expected to come close to 22,000, topping the previous high of January, 1948. Delays have been encountered in moving into volume production on the new Henry J model because of parts shortages resulting from strikes in suppliers' plants. These have been fairly well surmounted—assemblies averaging 100 daily—and public announcement of this lower-priced job will be made Sept. 29. The test of its public acceptance will not be long in coming.

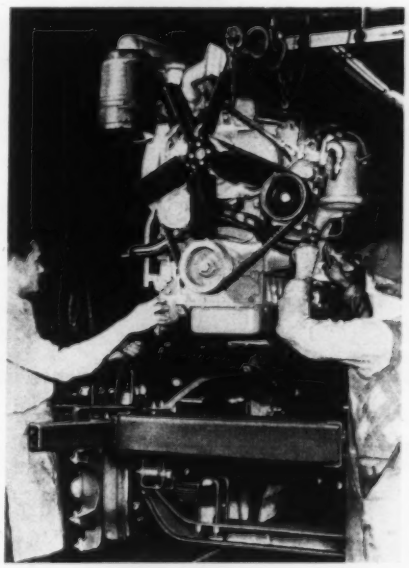
More Variety—Meanwhile two-and four-door sedans in the Kaiser line are rolling out to dealers, and they will be supplemented shortly by coupe bodies. A Portland, Oreg., assembly plant will be functioning next month, reinforcing West Coast stocks now coming principally from Long Beach, Calif. Details also are expected shortly concerning a new press plant, to be located near the principal source of flat-rolled steel.

Monthly bill for parts and materials now paid by K-F is estimated to approximate $20 million. It is paid directly to venders in more than 400 communities in every state of the country. Michigan is the top state, with each K-F model carrying an average of $313 worth of supplies from sources there. Next in volume is Indiana, followed by Ohio, Pennsylvania, California, Massachusetts, Wisconsin, Missouri and Illinois. This is about the same pattern as other auto builders follow.

The Leader—Detroit leads among the cities, with every K-F car having more than $200 worth of materials and parts originating in the motor capital. Other state per capita figures on components are: Indiana $182, Ohio $144, Pennsylvania $126, California $76, Massachusetts $29, Wisconsin and Missouri each $24, Illinois $14 and lesser amounts from other states.

The material study does not cover nonproductive items, necessary to manufacture but not appearing in the finished product. Total purchases are of course substantially higher than the $20 million monthly figure, as indicated by the fact the company stocks nearly 50,000 different manufacturing items, less than a third of them components of finished cars. The company estimates that jobs for more than 47,000 supplier plant employees depend in whole or in part upon its purchases.

Evolution in the Henry J—There have been a number of mechanical and styling changes in the Henry J model since its initial showing in Chicago in February. The front grille opening has been reworked to give it a more substantial appearance, and other decorative touches have been added to the body lines. Extensive road testing has pointed up several minor mechanical changes which have been made in the interest of improved performance and roadability. First body type to make its appearance publicly will be a two-door sedan, followed by a sports convertible.



"DIESEL WITH A DESTINY": That's what GMC Truck & Coach Division of General Motors likes to call its new 4-cylinder diesel engine. It is GMC's answer to heavy duty haulers who wanted the power and economy of the 2-cycle GMC diesel in lighter trucks of the heavy-duty range—those with gross combination weights of 45,000 and 55,000 pounds. Here an engine is being lowered into a chassis as it goes down the assembly line

The Cars Get Glassier

If there is one universal trend in all new models, and one that is going to proceed further, it is toward more glass area and more extensive use of curved glass sections. These developments have been at once bonanzas and headaches to both glass suppliers and body builders. To produce curved glass sections requires investment in much new additional equipment at glass plants, not to mention careful attention to processing technique in order to stay within limits of curvature. While these limits are considerably beyond thousandths of an inch, they must be kept close enough to permit ready mounting.

Hard Tops Start the Trend — The so-called hard-top convertible was the start of sharply curved glass sections in rear window lights, and the unanticipated universal popularity of this type of styling caught the glass manufacturers a little unawares from the standpoint of production facilities. However, they are getting abreast of the situation. Rear windows are of tempered plate glass and in general are produced by cutting the flat plate to the desired periphery and then moving it through a furnace at sufficient heat to permit the glass to "subside" to the curvature of the supporting fixture. Emerging from the furnace the glass is passed under air jets which give an accelerated quench to the outer surfaces, so that their fibers are in compression with respect to the internal fibers. In some ways the treatment resembles the hardening of steel.

Under certain angles of illumination the geometrical pattern of internal strains can be observed readily in this type of glass, particularly when reviewed through polaroid lenses. This is not a defect, rather simply typical of this heat treatment. When the glass receives a sharp impact it ruptures throughout in a geometrical system of fine cracks, but does not shatter.

Quick Junk—An incident is related

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dealing with a consignment of curved rear window lights received here by a body builder starting up on a new model. As one of the first pieces was removed from its shipping pallet, an inspector noted a peculiar pattern which at certain angles almost precluded clear vision. A representative of the glass supplier was called who, after studying the apparent defect, called for a hammer. He went systematically down the boxes of waiting glass sections and gave each piece a resounding blow which really made rejects of them. Then he said to throw the entire consignment on the junk heap, explaining it would be not worth the freight to ship the defective units back to his plant. That's Detroit for you—no quibbling, no conferences, no niff-nawing, just scrap the junk and teletype for a fresh supply. Keep the lines rolling.

Difficulties in processing satisfactory curved glass windshields and rear windows are matched with the trouble involved in mounting them quickly and securely. They must be literally floated in rubber molding strips and these must be firmly held in the steel frame or molding. If the glass is held too tightly it may bind and fracture, if too loosely there will surely develop a "leaker," the curse of dealer service departments. Steady improvement in mounting techniques and materials has eased the problem of leakers, but when curved glass panes first became popular service troubles were terrific.

GM Contract Pays Off

Chaining of wages to a cost-of-living index and the introduction of the "annual improvement factor" by General Motors in its labor contract in 1948 has been both lauded and condemned, and by both labor and management. In the sharp inflationary period following the Korean outbreak, the tieup has been rough on motor companies with other types of contracts. Chrysler, for example, was practically shut down by sporadic labor outbreaks throughout several of its key plants, even after suffering the protracted strike earlier this year.

Sudden decision by the company to raise wages 10 cents an hour stopped the trouble, yet at the same time will cost an estimated $25 million annually.

Packard was forced to come across on a basis practically the equivalent of the General Motors pattern to bring its 8000 employees back on the job. Briggs Mfg. Co. and Motor Products Corp. both put through raises to match the Chrysler boost. Now the Ford local is making menacing gestures of walkouts to enforce demands for wage boosts. It appears inevitable that many smaller parts companies will be next to feel the squeeze.

What of the effect on auto prices? So far, all manufacturers have stated they will try to absorb higher costs by production economies, hoping that the sudden jump in living costs is only temporary. However, should the living cost index drop sufficiently, General Motors is in position to lower its rates because of contract stipulations, while its competitors will not be able to do so since their most recent increases were simply made to meet the pattern. Inevitably the situation will lead to higher automobile prices. The only question is how soon.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
May	732,161	508,101
June	897,864	523,689
Six Months	3,941,883	3,034,055
July	746,771	604,351
August	840,000*	678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
Aug. 12	182,965	146,317
Aug. 19	190,879	149,359
Aug. 26	180,540	155,367
Sept. 2	175,000	146,039

Estimates by Ward's Automotive Reports

* Preliminary.

Broaching Practice Improves

Noteworthy achievements in the field of broaching practice, accelerated by the appearance of new automatic transmission designs, is in the machining of internal high-speed gears, both spur and helical. Accepted production practice for precision gears has been rough broaching of the teeth in the blank followed by gear shaping and then gear shaving. These steps were considered necessary because of close tolerances on all tooth characteristics and the need for insured quiet operation.

A couple of years ago Warner Gear Division decided to experiment with broaching on overdrive ring gears, confining machining steps to rough and finish broaching. Working with engineers of National Broach & Machine Co., the company found it possible to meet tolerances and finish, to reduce tooling costs 60 per cent, double production and replace the original machine equipment comprising a broaching machine, 18 gear shapers and two gear shavers with one rough broaching machine pulling two broaches simultaneously, and three finish broaching machines. A key factor, of course, is the accuracy of the broaches and the ability to duplicate them on replacement tools.

Later Buick Motor Division studied the possibilities of doing the same thing on an internal helical gear for its Dynaflow transmission. The original plan of using gear shavers was discarded in favor of rough and finish broaching, and the new setup is performing with appreciable economy over the first proposal.

High-speed steel broaches are spline ground, using a master lead bar to insure accuracy and uniformity in duplication. Finish broaches at Warner Gear produced about 38,000 work pieces before being discarded. A special heat treatment is given the tools to provide a hardened case about 0.0015-inch deep.

Chrysler Installs "Iron Hand"

Chrysler Corp. is installing some specially designed Sahlin "iron hand" devices on fender presses at its Nine-Mile press plant, with a 5-foot reach into the dies to remove stampings on the upstroke of the press. The die is centered in a Hamilton press with exceptionally deep front-to-back bed, requiring more than ordinary movement of the "hand" to reach the stamping. The device will be used on the lead press in every line, being synchronized through limit switches with operation of the press. Harry Sahlin has played a leading role in the development of this type of equipment over the last ten years, and it is now used widely in many large stamping plants.

Car Registrations Continue High

New car registrations in July are expected to total about 540,000 units when all the states are tabulated, says R. L. Polk & Co. That would compare with a record high of 583,937 for June of this year and 448,477 in July, 1949.

The July estimate was made on the basis of registrations tabulated in 21 states. It would be the second highest monthly figure in the history of the automotive industry. From January through June, 2,829,952 new cars were registered.

July truck registrations are expected to be very close to a record of 108,168 established in April, 1948.

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What engineering features are responsible for LAPOINTE LEADERSHIP in building *BROACHING MACHINES*?

A broaching machine is only as good as its fixtures. We present, here, the impressive story of the *new and improved* Lapointe

TIP-DOWN FIXTURES

which are standard equipment on all our single and double ram vertical surface broaching machines.

1 Accurate, fast, versatile — they will handle 80% of all surface-broaching requirements.

2 Convenient to load—eliminate fatigue.

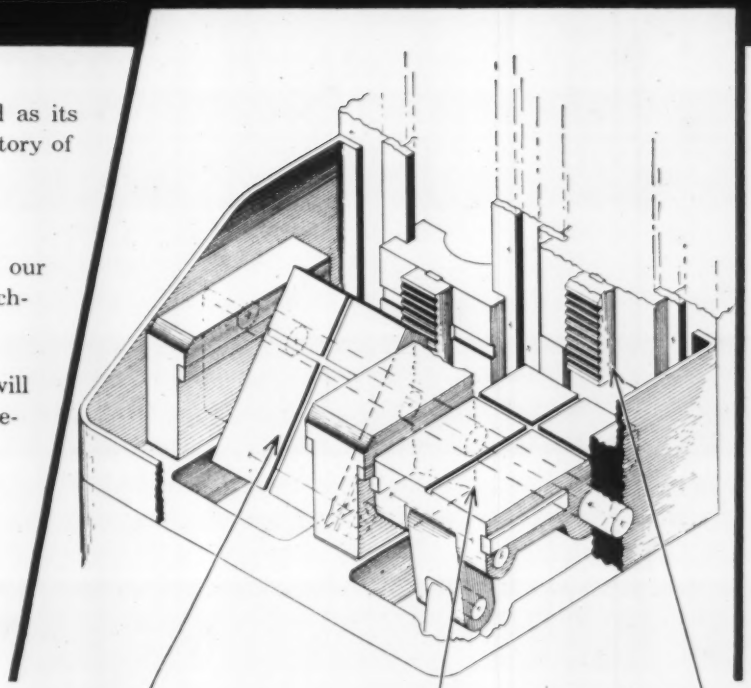
3 Utilize full stroke of machine.

4 Permit use of a great variety of work holders that can be manually or hydraulically clamped.

5 Allow use of fully adjustable work holders to compensate for broach wear.

6 Safe to operate.

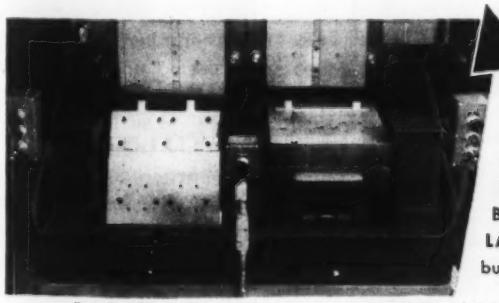
7 Sturdy and rugged.



TIPS DOWN into convenient position for loading and unloading, with locating points in clear view of operator for fast part handling.

TIPS UP for broaching, with sturdy, rigid support locked securely against hardened and ground stops on both sides of trunion blocks.

Utilizes full stroke of the machine!



COMPLETE ENGINEERING DATA and dimensions on double ram and single ram LAPOINTE Vertical Broaching Machines will be found in these two illustrated bulletins. You are invited to send for Bulletins DRV-3 and SRV-3.

LAPOINTE Vertical Broaching Machines are all built to JIC Standards at no extra cost.

LAPOINTE takes the responsibility for the entire job — machines, tools, and fixtures. That's a big reason for Lapointe Leadership . . . that's why "Lapointe's the way to *better broaching*!"

THE *Lapointe* MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

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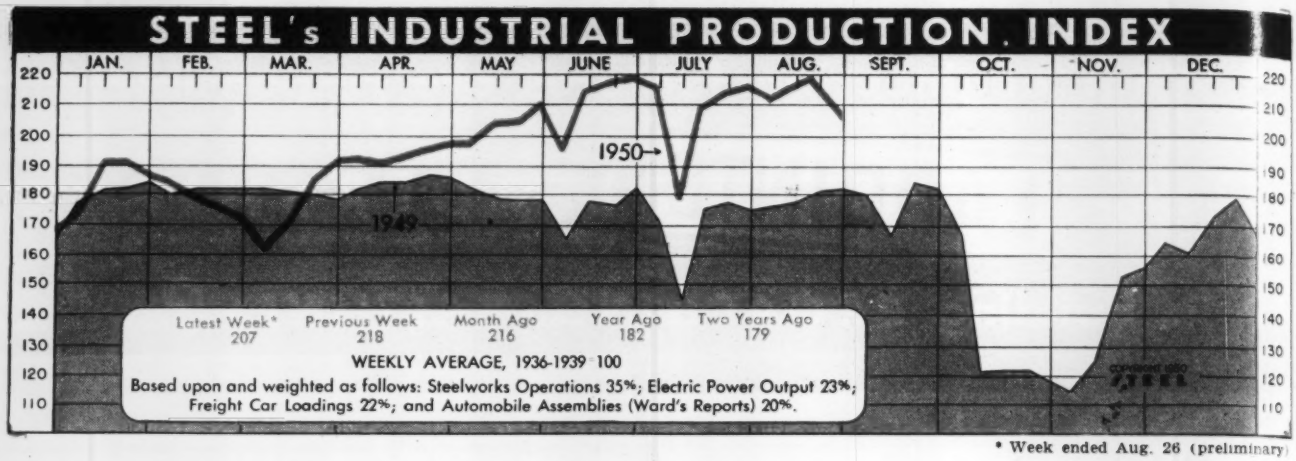
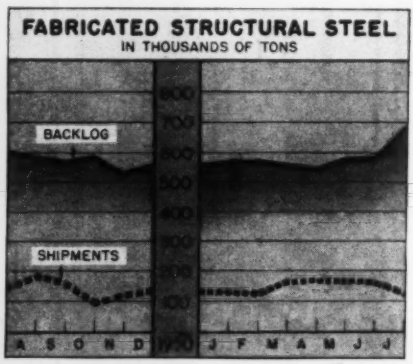
HUDSON LAPOINTE MASS.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
220 210 200 190 180 170 160 150 140 130 120 110
1950→
1949
Latest Week* 207
Previous Week 218
Month Ago 216
Year Ago 182
Two Years Ago 179
WEEKLY AVERAGE, 1936-1939 100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

* Week ended Aug. 26 (preliminary)



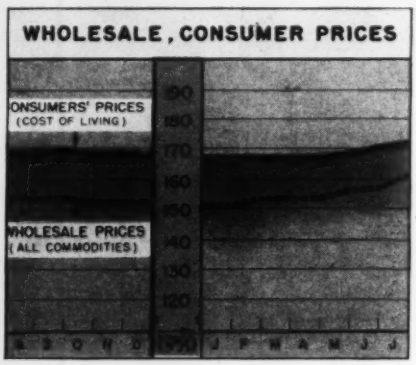
Charts—Copyright 1950, STEEL

Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlog	
	1950	1949	1950	1949
Jan.	135.2	152.7	565	675
Feb.	129.6	145.9	565	683
Mar.	156.8	185.9	556	582
Apr.	164.4	179.2	540	628
May	168.1	171.1	578	599
June	172.1	172.3	580	583
July	132.4	148.0	684	605
Aug.	....	183.9	...	583
Sept.	....	162.1	...	562
Oct.	....	99.8	...	584
Nov.	....	117.2	...	527
Dec.	....	135.5	...	555
Total	....	1,853.5	...	...

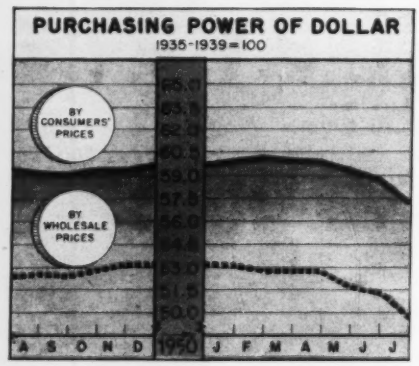
American Institute of Steel Construction



Price Indexes

	Wholesale		Consumers	
	1950	1949	1950	1949
Jan.	151.6	160.5	166.9	170.9
Feb.	152.7	158.1	166.5	169.0
Mar.	152.6	158.4	167.0	169.5
Apr.	152.9	156.9	167.3	169.7
May	155.9	155.7	168.6	169.2
June	157.3	154.4	170.2	169.6
July	162.9	153.4	172.5	168.5
Aug.	....	153.0	....	168.8
Sept.	....	153.6	....	169.6
Oct.	....	152.2	....	168.5
Nov.	....	151.6	....	168.6
Dec.	....	151.3	....	167.5
Average	....	154.9	....	169.1

Bureau of Labor Statistics



Purchasing Power of the Dollar

As Measured by:

	Wholesale Prices		Consumers' Prices	
	1950	1949	1950	1949
Jan.	53.1	50.1	59.9	58.5
Feb.	52.7	50.9	60.1	59.2
Mar.	52.7	50.8	59.9	59.0
Apr.	52.6	51.2	59.8	58.9
May	51.6	51.6	59.3	59.1
June	51.2	52.0	58.8	59.0
July	49.5	52.4	57.4	59.3
Aug.	...	52.6	...	59.2
Sept.	...	52.4	...	59.0
Oct.	...	52.8	...	59.3
Nov.	...	53.2	...	59.3
Dec.	...	53.2	...	59.7

U. S. Office of Business Economics

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction Aug.28	Gear Sales Aug.7	Refrigerators Aug.21
Durables Aug.28	Indus. Prod. Aug.7	Steel Castings Aug.21
Employ., Metalwkg..Aug.21	Ironers Aug.21	Steel Forgings Aug.7
Employ., Steel Aug.21	Machine Tools Aug.28	Steel Shipments ...Aug.28
Foundry Equip. ...Aug.7	Malleable Cast. Aug.28	Trucks, Elec. Ind...Jan.2
Freight Cars Aug.14	Pump Orders Aug.14	Wages, Metalwkg...Aug.21
Furnaces, W. Air ..Aug.14	Radio, TV Aug.14	Washers Aug.14
Furnaces, Indus. ..Aug.14	Ranges, Elec. Aug.28	Water Heaters July10

Structural Bookings Stay Up

Structural bookings in July remained at levels unequaled since 1942 as industry bookings fell only a shade short of the June total. The industry's bookings in the latest month reported were 265,771 tons, a month earlier they were 266,612. July's bookings reflect to a large extent the desire of customers to get on fabricators' books before a possible government clamp down on certain forms of building. Rush to place orders has subsided a little but shops are busy estimating on many jobs. Backlog jumped to 684,538 tons at the end of July from 579,583 tons a month earlier.

Vacation shutdowns affected July shipments in fabricated structural steel just as they did other metalworking industries. Shipments fell off to 132,367 tons from 172,096 in June.

Prices Highest in Two Years

Bearing out earlier estimates the Bureau of Labor Statistics consumers' price index climbed sharply in the one month period ended July 15 and reached 172.5 per cent of the 1935-1939 average. The latest index is 1.4 per cent higher than the figure for one month earlier and 2.4 per cent higher than a year ago. It is at the highest level since October, 1948.

Largest advance was recorded in food prices which rose 2.6 per cent during the month. Fractional increases were reported for house furnishings, miscellaneous goods and services, rents and fuels. Apparel was the only major group in which prices averaged slightly below the June 15 level.

A special tabulation by the bureau covering a time period one month beyond that in the index shows that food prices declined slightly from the July 15 level although some items continued to move upward.

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The Business Trend

Metalworking companies find it difficult to maintain output high enough to meet demand with labor unrest adding to materials shortages

LABOR unrest keeps production totals for metalworking companies short of what they might be. Companies now negotiating contracts are faced with labor demands for higher wages instead of pensions and many others whose contracts include a reopening provision will be up against this issue soon. Even those companies with contracts that provide for no reopening for wage talks may be pressured into boosting wages if they don't want their output slowed to a walk by "unauthorized" strikes.

This poses a difficult problem for the manufacturer. The federal administration looks upon price increases by industry, especially the large corporations, with a jaundiced eye. But if higher labor costs are piled on top increased raw materials outlays then selling prices will have to go up. Insiders in Washington say the administration is not inclined to clamp down wage controls before elections so industry may find its road rocky for a while.

Some indication of what is to come for all civilian goods production may be found in the Commerce Department's action last week in ordering a 13 per cent slash in civilian rubber consumption. Manufacturers working on military orders can get all the rubber they want for their work. The order went into effect Sept. 1 and will continue for the rest of the year.

Declines in steelmaking rate and in automotive assemblies forced STEEL'S industrial production index down 11 points in the week ended Aug. 26 to 207 per cent (preliminary) of the 1936-1939 average. Strikes, either directly or indirectly, caused the drop in industrial output.

Steel Rate Picks Up . . .

A sizable portion of the decline in the output rate for steel ingots and castings was regained last week. In the week ended Aug. 26 steelmaking furnaces operated at 90 per cent of theoretical capacity when the branch line railroad strike crippled operations at several midwestern steel centers. About 200,000 tons of vitally needed ingots were lost because of the walkout.

Assemblies Forced Down . . .

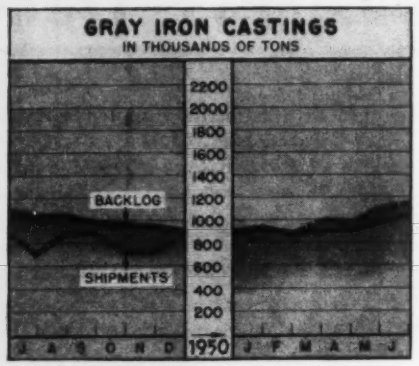
Labor unrest and tight metals supplies forced passenger car and truck assemblies down to 180,540 units in the week ended Aug. 26 from 190,879 one week earlier. Expected August production totals for U.S. plants are 675,000 cars and 140,000 trucks. This is the second best assembly total in industry history and trails only June of this year. Truck output exceeds that in June.

More Coal . . .

Bituminous coal output continued its slow production rise in the week ended Aug. 19 as 11,240,000 tons were produced. Although this output rate is well below the industry's potential, it does represent measure of recovery for what has often been described as a sick industry. Absence of work stoppages and abbreviated workweeks is gradually closing the gap between 1949's and this year's output. Up through the week ended

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	90.0	100.0	98.5	84.5
	Electric Power Distributed (million kilowatt hours)	6,345	6,370	6,190	5,523
	Bituminous Coal Production (daily av.—1000 tons)	1,873	1,805	1,867	1,254
	Petroleum Production (daily av.—1000 bbl)	4,769	5,674	5,522	4,769
	Construction Volume (ENR—Unit $1,000,000)	$198.8	$250.1	$252.5	$147.7
	Automobile and Truck Output (Ward's—number units)	180,540	190,879	191,978	155,367
	*Dates on request. † 1950 weekly capacity is 1,926,803 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (unit—1000 cars)	810†	851	845	749
	Business Failures (Dun & Bradstreet, number)	176	186	160	176
	Money in Circulation (in millions of dollars)‡	$26,963	$26,976	$26,915	$27,328
	Department Store Sales (changes from like wk. a yr. ago)‡	+12%	+25%	+46%	−7%
	† Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$15,375	$15,328	$14,222	$11,938
	Federal Gross Debt (billions)	$257.8	$257.6	$257.4	$255.3
	Bond Volume, NYSE (millions)	$15.6	$19.7	$33.7	$11.4
	Stocks Sales, NYSE (thousands of shares)	8,198	8,323	11,876	3,662
	Loans and Investments (billions)†	$68.1	$67.9	$67.9	$64.7
	United States Gov't Obligations Held (millions)†	$35,078	$35,154	$36,222	$36,485
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Index††	156.99	156.99	156.69	152.52
	STEEL's Nonferrous Metal Price Index‡	206.8	200.2	194.2	180.3
	All Commodities†	166.1	164.9	163.7	152.7
	Metals and Metal Products†	174.9	174.2	173.5	168.2
	† Bureau of Labor Statistics Index, 1926=100 ‡ 1936-1939=100. †† 1935-1939=100.				

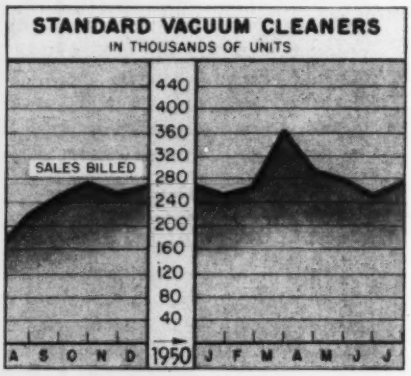


Gray Iron Castings

Thousands of Net Tons

	Shipments 1950	Shipments 1949	Backlogs* 1950	Backlogs* 1949
Jan.	913	1,040	914	2,065
Feb.	864	987	873	1,857
Mar.	996	1,075	922	1,639
Apr.	981	929	922	1,446
May	1,095	867	978	1,243
June	1,136	906	1,040	1,087
July	...	697	...	1,032
Aug.	...	872	...	1,048
Sept.	...	881	...	980
Oct.	...	716	...	955
Nov.	...	719	...	939
Dec.	...	862	...	892
Total	...	10,551		

*For Sale. Bureau of the Census

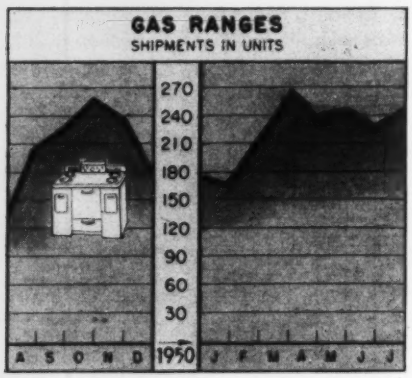


Standard Vacuum Cleaners

Sales Billed—Units

	1950	1949	1948
Jan.	249,150	228,769	304,273
Feb.	263,515	241,267	311,448
Mar.	361,014	309,897	355,415
Apr.	292,664	252,656	306,588
May	278,645	222,850	276,657
June	250,190	207,354	256,071
July	279,967	161,920	229,537
Aug.	.....	219,909	237,202
Sept.	.....	250,036	280,084
Oct.	.....	272,520	281,573
Nov.	.....	253,516	255,080
Dec.	.....	265,513	273,890
Total	.....	2,886,514	3,360,859

Vacuum Cleaner Manufacturers Assoc.



Gas Ranges

Shipments in Units

	1950	1949	1948
Jan.	165,000	106,700	222,800
Feb.	209,000	117,700	228,400
Mar.	264,000	151,500	252,100
Apr.	239,100	150,100	245,300
May	242,800	151,600	257,800
June	224,700	162,200	250,500
July	248,000	125,800	203,600
Aug.	.....	206,100	250,100
Sept.	.....	227,300	248,500
Oct.	.....	257,500	257,500
Nov.	.....	237,400	202,300
Dec.	.....	175,700	131,100

Gas Appliance Mfrs. Assoc.

Charts—Copyright, 1950, STEEL

Aug. 19 bituminous coal output this year was 298,796,000 tons, compared with 309,658,000 tons in the like period a year ago.

Awards Slump . . .

All private construction categories registered a drop in the week ended Aug. 24 with the result that engineering contract awards dropped to $198.8 million from $250.1 million. Even with the decline in awards during August the cumulative total for the first 34 weeks this year is $7662 million, 43 per cent above a year ago.

Another FRB Record . . .

Preliminary estimate by the Federal Reserve Board is that its index will reach a new high of 204 in August. Previous best mark was set in June when the index reached 199. July's index showed the effect of plant closings for vacations as it eased 2 points from the June total to 197 per cent of the 1935-1939 average. It was still the second best peacetime effort recorded.

Fewer New Companies . . .

July witnessed a rather sharp drop in formation of new business enterprises, reports Dun & Bradstreet Inc. Charters totaled 7225, down 18.5 per cent from the 8861 total for June. The July total was 12.5 per cent higher than the 6424 businesses started in the like month a year ago. Total for the first seven months is 59,663 for a 18.6 per cent gain over the similar period in 1949.

West's Growth Continues

Investment in first six months more than three times as large as in like 1949 period

INDUSTRIAL expansion in the western states is still proceeding at a fast pace.

A survey by the Southern Pacific Railroad shows that in the 12 months ended July 1, 1950, more than 400 new plants, many of them representing new industries in the West, were established at a cost of about $106 million.

Although this expansion was less than in the 12 months ended July 1, 1949, when 500 new plants costing $118 million were built, activity picked up sharply in the first half of this year. If it continues at a similar rate during the last six months, the total for the calendar year 1950 will show a substantial gain. In the first six months this year $70 million was invested in new plants compared with only $21 million in the first six months of 1949.

Southern Pacific's tabulation covers only larger concerns, those which ship products in carload lots. It does not count large numbers of small enterprises which also have been established during the period.

The report comments that the trend so far this year has been toward larger type industrial installations. Another notable factor has been the widening diversification of new industry. The survey says the list includes companies manufacturing such varied lines as drugs, chemicals, paper containers, iron and steel distribution centers, electrical goods, building materials and others.

PEI Cancels Sales Meeting

The Korean war has caused the Porcelain Enamel Institute to cancel its 1950 sales and management conference, originally scheduled in Cleveland, Oct. 5-6.

The industry's thinking has been diverted from major attention on sales methods to how peacetime production will be affected by the defense program.

Profits Depend on Steel

Steel availability will be an important factor in determining how good earnings will be this year for Pullman Inc., New York. Profits in the first half topped those for the like period a year ago largely on the strength of great improvement in the second quarter when earnings

UNIVERSITY OF MICHIGAN LIBRARIES

were more than three times as large as they were in the first three months.

Pullman-Standard Car Mfg. Co., one of the firm's two principal subsidiaries, is the country's largest builder of freight cars. Its backlog is up to about 15,000 cars, compared with only 700 at the beginning of the year. Pullman-Standard made money on both passenger car and freight car building in the second quarter. Car building will play an increasingly important role in earnings in the second half. A month-long strike at the Bessemer, Ala., plant early in the second half will offset part of the gains.

M. W. Kellogg Co., the company's other major subsidiary, will aid overall earnings because of new contracts it received this year. More than half Kellogg's activity is devoted to refinery construction and other work for the petroleum industry.

Cummins Diesel Busy

In order to sustain production at current high levels and meet heavy demand for its products Cummins Engine Co. Inc., Columbus, Ind., has authorized substantial capital expenditures for the rest of 1950 and early 1951. Irwin Miller, president, says that consolidated net income in the first half exceeded the amount earned in any corresponding six months and topped earnings for all last year.

Lakey Backlog Totals $9 Million

Backlog at Lakey Foundry & Machine Co., Muskegon, Mich., stands at $9 million and operations in the current quarter are expected to result in higher earnings than in the quarter ended July 31. Earnings in the earlier period did not meet expectations because of heavy initial expenses involved in going to a two-turn operation at the No. 5 foundry. Although it is impossible to predict what effect the present situation will have on the company's operations, President J. O. Ostergren says he is hopeful the improvement will last beyond end of the fiscal year on Oct. 31.

Twin Coach Rides Sales Curve

Sales volume of about $3,250,000 per month by the end of this year is predicted by officials of Twin Coach Co., Kent, O. In mid-August the company's backlog totaled $18.4 million and was more than double a year ago. Unfilled orders consist of $11.5 million for motor coaches built in Kent and Ft. Erie, Ont., and $6.9 million for aircraft production at the Buffalo plant.

Present expanding bus backlog will boost Twin Coach's outturn rate from the current 1½ units daily to six per day by the end of the year. Bus building operations will run close to the break-even point in this quarter and will show substantial profits in the fourth quarter, company officials say. Widespread demand for its new line of propane-powered busses is responsible for the improvement in bus order volume.

New Plant Will Boost Sales

United Specialties Co., Chicago, expects that opening a plant in Birmingham will mean an additional $2 million annually in sales. The company leased the southern plant recently after getting a new contract with Ford for manufacture of air cleaners. Operations started in mid-August on the company's line of metal toys until dies for making the air cleaners are ready in mid-October. Directors recently appropriated $500,000 to expand present plants and buy more equipment.

United plans to continue making the toy wagons using steel not needed for air cleaners. An assured supply of steel allocated to the Birmingham plant is money-in-the-bank toward assuring operations in good volume.

United's entry into television picture tube cone manufacture could add another $500,000 a month to sales if the war doesn't interfere, John T. Beatty, president, says. The company developed a process for spinning stainless steel cones and sold about 50,000 monthly in the last quarter. Now it is working on a metal cone for use in rectangular television viewing tubes.

Healthier Business Climate Trims Failures

FAILURES in manufacturing and mining are on the downgrade as a result of the current business boom. Additional rearmament work will give a helping hand to some weaker companies and push the monthly failure rate still lower.

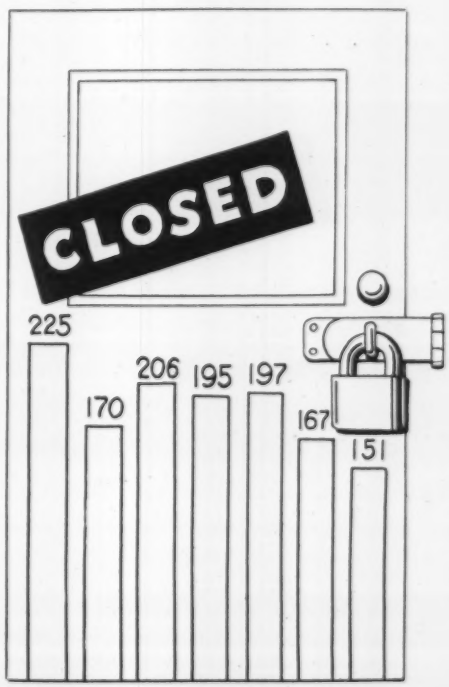
Highest number of failures reported by Dun & Bradstreet in the first seven months and shown in the accompanying chart came in January when the total reached 225. Since then the trend has reversed and July's total of 151 was the lowest this year. Total failures for the first seven months are 1311, compared with 1348 a year ago.

Less Money Lost—Not only are there fewer failures numerically but liabilities for the first seven months are down to $62.3 million from $90.1 million last year. July's liabilities were up to $8.5 million from $7.2 million in June.

Aside from manufacturing and mining, other industrial groups are also finding it a little easier to keep going. Other classifications included in the overall total are wholesale and retail trade, construction and commercial services. Business failures in all groups totaled 694 in July, also a low point for the year. Liabilities in all business groups in the first seven months are $158 million, compared with $190.4 million in the like 1949 period. Casualties of all sizes except those between $25,000 and $100,000 were less numerous in July than in June.

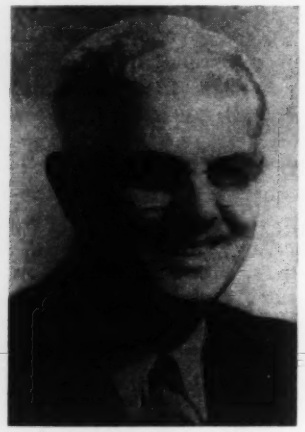
Tough on Newcomers—Following the usual pattern most of July's failures were in concerns which began operations in the last five years. Slightly over 40 per cent were over between three and five years old while about 25 per cent were under three years old. Only 5 per cent were firms begun in 1950.

Manufacturing, Mining Failures Dip



Source: Dun & Bradstreet. Failures in units.

Men of Industry



ALAN J. BRONOLD
. . . Sterling Electric sales manager

Sterling Electric Motors Inc., Los Angeles, appointed **Alan J. Bronold** sales manager. He assumes duties of **Allen Adams**, who for a number of years has headed up Sterling's international and domestic sales organization, and due to illness is stepping down from active sales management but continues as a company officer. Mr. Bronold has been with Westinghouse Electric Corp. for a number of years, and recently held the position of assistant general sales manager in charge of national sales for the Sturtevant Division.

Lawrence H. Russell was appointed sales manager, **Walker-Turner Division**, Kearney & Trecker Corp., Plainfield, N. J. He joins the division with ten years of experience in the power tool field, three years as sales manager of the Power King Division of Atlas Press Co.

Bridgeport Brass Co., Bridgeport, Conn., appointed **E. D. Casseday** as Houston district sales manager to succeed **George Chatneuff.** Mr. Casseday was recently associated with Bridgeport's Los Angeles office, and has been connected with the copper and brass industry for the last 15 years.

Don Schwartz was appointed sales engineer in charge of the **Sutco Motor & Coil Division** of O. A. Sutton Corp., Wichita, Kans. In this post Mr. Schwartz takes charge of sales and customer contacts with industrial buyers of Sutco fractional horsepower AC electric motors and speed control choke coils. For the last three years he has been West Coast and Mid-Central district sales manager for the parent company.

JOHN R. HARBAUGH
. . . asst. gen. sales mgr. at Jessop

John R. Harbaugh was appointed assistant general manager of sales, **Jessop Steel Co.**, Washington, Pa. He has been associated with the company for the last ten years doing special assignment work in metallurgical sales. **Homer A. Mawhinney** was named district manager of the southern territory, with offices in Birmingham.

Norman Krey was appointed manager, reduction plant operations, for **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. **Stanley B. White** will become manager of all Kaiser Aluminum fabricating plant operations. **J. H. Lindemuth** will succeed Mr. Krey as manager of the Mead and Tacoma reduction plants, and **Arthur Branstead** will succeed Mr. Lindemuth as manager of the Trentwood rolling mill.

Douglass S. Collins was named to take charge of sales for **Electro Manganese Corp.**, Knoxville, Tenn. Sales are now being handled directly from the company's plant with Mr. Collins holding the title of sales representative.

John Taylor was appointed vice president in charge of the management and industrial engineering division, **Lester B. Knight & Associates Inc.**, Chicago and New York consulting engineering firm.

R. J. Vanden Heuvel is the new general sales manager of **Milwaukee Chaplet & Mfg. Co.**, Milwaukee.

Hamilton Merrill was elected president of **Manning, Maxwell & Moore Inc.**, Bridgeport, Conn.

CHARLES E. SMART
. . . new president, W. & L. E. Gurley

Charles E. Smart was elected president, **W. & L. E. Gurley**, Troy, N. Y., manufacturer of engineering and surveying instruments. He joined the company in 1920 as works manager and became a director in 1926. In 1945 he was elected secretary, the office he held until his election as successor to **C. I. Day**, who died in June. **Lester C. Higbee**, general sales manager, was elected secretary.

E. W. Bliss Co., Toledo, O., announces the return of **E. V. Crane** to its engineering staff. Mr. Crane was formerly with Bliss for 25 years. He left during the war to accept a position with Sam Tour & Co., research and engineering organization, as vice president in charge of mechanical engineering. Later he was chief engineer, Hydraulic Press Mfg. Co. He now will make his headquarters at the new Bliss plant at Canton, O., where the building of rolling mills and large mechanical and hydraulic presses will be centered.

George O. Keutgen was appointed assistant to **Del S. Harter**, vice president-manufacturing, **Ford Motor Co.**, Dearborn, Mich. Mr. Keutgen succeeds **Richard E. Krafve**, and in his new capacity will be responsible for special studies and analyses, and for co-ordinating administration, organization and procedure activities.

Standard Alloy Co., Cleveland, announces personnel changes: **Charles Plant Jr.**, foundry superintendent, was appointed assistant to the president; **Joseph L. Lessman** succeeds Mr. Plant; **Jack Matz** is now in charge of quality control and is succeeded in the company's laboratory by **John E.**

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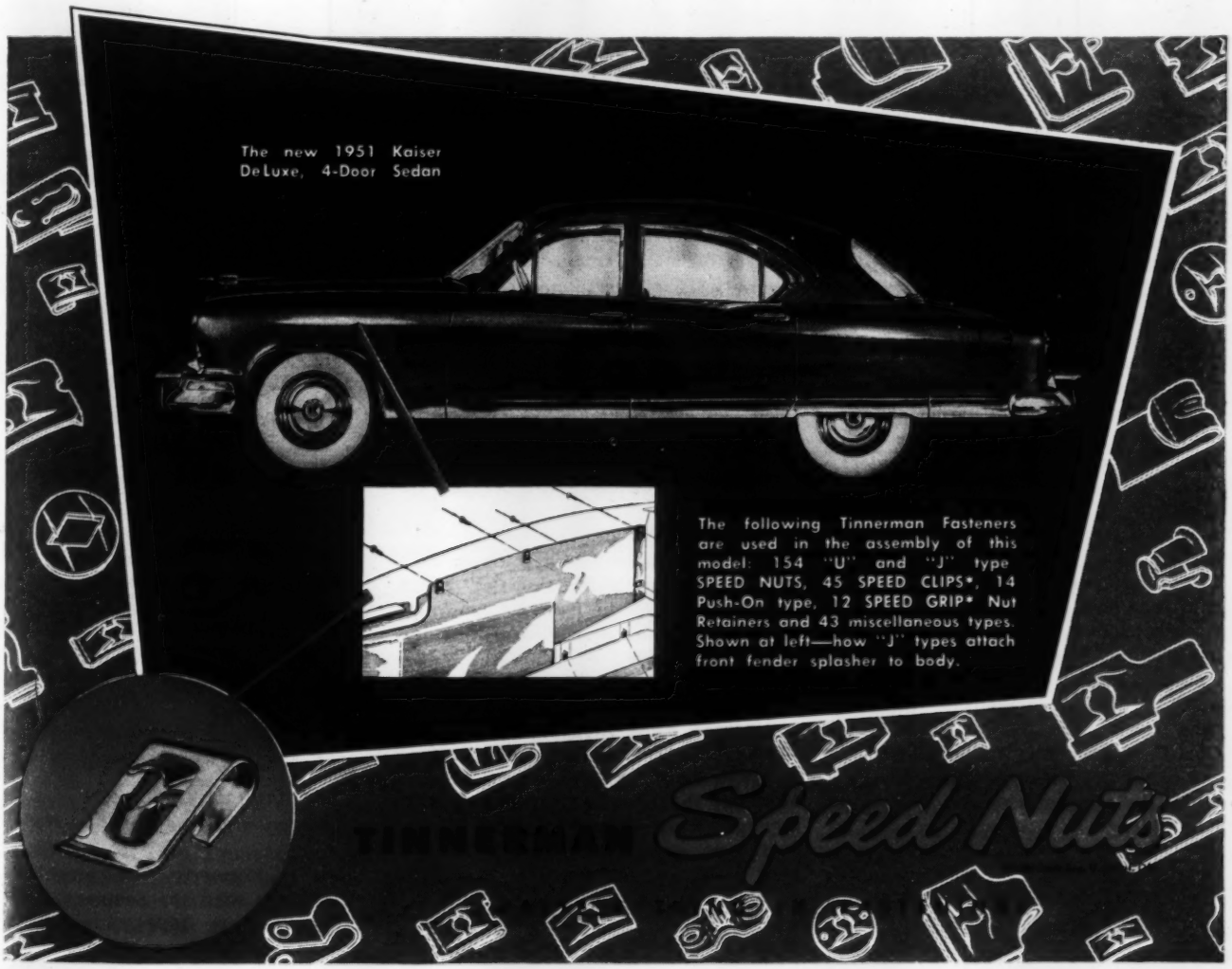
1951 KAISER Takes SPEED NUT Route To *better assembly*

When the sleek, new Kaiser for 1951 was taking shape on designers' drawing boards, an important economy and performance decision was made. On the basis of previous experience, it was agreed that maximum use should be made of SPEED NUTS for vital fastening functions.

From bumper to bumper of the new car, K-F engineers made the most of the cost-saving, product-improving assembly advantages of SPEED NUTS. Result . . . there are 269 of these lightning-fast, self-locking fasteners used for various attachments on all Kaiser models.

Kaiser-Frazer's reasons for specifying SPEED NUT brand fasteners can be yours: they're the most economical and effective fasteners ever developed. Let us prove it with a comprehensive Fastening Analysis of your product. Meanwhile—get your copy of "Savings Stories", a book-full of cost-saving fastening ideas.

Ask your Tinnerman representative for a copy, or write: TINNERMAN PRODUCTS, INC., Cleveland, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In England: Simmons Aerocessories, Ltd., Treforest, Wales.


The new 1951 Kaiser DeLuxe, 4-Door Sedan
The following Tinnerman Fasteners are used in the assembly of this model: 154 "U" and "J" type SPEED NUTS, 45 SPEED CLIPS*, 14 Push-On type, 12 SPEED GRIP* Nut Retainers and 43 miscellaneous types. Shown at left—how "J" types attach front fender splasher to body.
TINNERMAN
Speed Nuts

O'Malley; Warren B. Lum was appointed sales manager, and **H. M. Smith Jr.**, purchasing agent.

Eric G. Peterson was elected to the board of directors and appointed vice president of **Peabody Engineering**

ERIC G. PETERSON
. . . vice president and director, Peabody Eng.

Corp., New York. In addition to his new duties he will continue to fill the position of general manager in charge of both the New York office and the Stamford plant.

Karl A. Panitz was named chief engineer, **National Motor Bearing Co.**, Redwood City, Calif. He formerly was vice president in charge of production for Arthur Colton Co., Detroit.

William C. Walsh was appointed western regional sales manager, replacement tube division, **General Electric Co.**, Schenectady, N. Y. **K. N. Bush** was named production manager, large apparatus divisions, to succeed **T. F. Garahan,** recently appointed vice chairman of the G-E apparatus department's mobilization planning committee. **William B. Snyder** was appointed assistant manager, steel mill division, apparatus department.

After 41 years with **Electric Storage Battery Co.**, Philadelphia, **W. B. Bowie** has retired. Starting as a sales engineer in the New York office, he became manager at Rochester in 1913, at Pittsburgh in 1938, and finally manager of engineering sales at the Philadelphia plant.

Carl F. Megelin was appointed manager of a new special products department, **Kellogg Switchboard & Supply Co.**, Chicago.

George Habicht Jr. was elected chairman of the board of **Marshall & Huschart Machinery Co.**, Chicago. He is succeeded as president by **Frank L. Armstrong,** former vice president and general manager.

Robert W. Englehart was elected president, **Parker Rust Proof Co.**, Chicago, succeeding **Van N. Darsey,** who was elected vice chairman. Mr. Englehart formerly was executive vice president. **F. J. DeWitt Jr.**, former general sales manager, was elected vice president in charge of sales.

Selden S. Partridge Jr. was appointed manager of **Southern States Iron Roofing Co.'s** plant in New Orleans. He replaces **John P. Starnes,** recently promoted to district sales manager in Nashville, Tenn.

Harold V. Barker was appointed manager of the newly created southern branch office at Greenville, S. C., for **Durant Mfg. Co.**

James M. Stapleton was appointed

JAMES M. STAPLETON
. . . ass't to V. P. blast furnaces, Carnegie

assistant to the vice president of blast furnaces, **Carnegie-Illinois Steel Corp.**, subsidiary, U. S. Steel Corp., with offices in Pittsburgh. He formerly was division superintendent of blast furnaces at the South Works.

Waldo J. Mordini was appointed western division engine sales representative for **Caterpillar Tractor Co.** His headquarters will be in San Leandro, Calif.

Marion H. Freedman was appointed division vice president of the Pacific Northwest sales division, **Columbia Steel Co.**, U. S. Steel Corp. subsidiary, and will have an office in Seattle. **Marshall B. Harrison** was appointed manager of sales for the Oregon area of the division, with office in Portland.

Jan R. Dunsford announces opening of a Cleveland office with **W. Don Logan,** formerly of Westinghouse Electric Corp. They are representing Electric Dynamic Works, Electric Boat Co., Pelham Electric Mfg. Corp., and Green Electric Sales Corp.

Lester E. Reeve joined **Mack Trucks Inc.**, New York, as special assistant on financial matters to **E. D. Bransome,** chairman and president.

Henry F. Miller Jr. was appointed district manager, **Hershey Machine & Foundry Co.**, Utica, N. Y. He will cover the central New York area.

Tracerlab Inc., Boston, appointed **Sidney S. Minault** as production manager. He was chief production engineer at Ansco, and has had broad experience in electronic production and engineering.

Howard B. Myers, formerly technical director, Roll Manufacturers Institute, Pittsburgh, has joined **S. H. Bell Co.**, Pittsburgh, as metallurgical engineer. He will be engaged in selling ferro-alloys and pig iron produced by Tennessee Products & Chemical Corp.

George D. Grogan and **Donald Macfarlan Jr.** were appointed district sales managers in Chicago and Detroit, respectively, for the heavy chemicals department, **Pennsylvania Salt Mfg. Co.**, Philadelphia. **H. G. Potts** was named supervisor of technical service for midwestern areas. **L. H. Brandt** was appointed product supervisor in the Philadelphia office, and new assistant product supervisors are **A. C. Jones** and **Miss E. M. DeHaas.**

Gunner E. Gunderson was named president of **Brad Foote Gear Works,**

GUNNER E. GUNDERSON
. . . new president, Brad Foote Gear Works

Chicago. Formerly vice president, he has been with the company since its inception in 1924 and was in charge of production. Other officers

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PHILIP BARNES
. . . gen. sales mgr., Weston Electrical

BENJAMIN SAMPSON
. . . gen. sales mgr., K. H. Huppert

SOL PREDEGER
. . . Majestic Radio & Television V. P.

elected are **E. J. Lindgren,** vice president; and **H. J. Buescher,** secretary-treasurer.

Philip Barnes was appointed general sales manager of **Weston Electrical Instrument Corp.,** Newark, N. J. Associated with the organization 16 years, he formerly was advertising manager.

Black & Decker Mfg. Co., Towson, Md., elected **Thomas I. Burbage** as secretary to succeed the late **Harry G. Wheeler.** Mr. Burbage joined the company in 1930 and has held positions of increasing responsibility including assistant purchasing agent, personnel manager, and currently assistant to the vice president in charge of manufacturing.

Arma Corp., Brooklyn, N. Y., announces that **Allen W. Walz,** who recently served the firm as a consultant on industrial relations, will now serve on full time basis as industrial relations manager.

Appointment of **Benjamin Sampson** as general sales manager was announced by **K. H. Huppert Co.,** Chicago, manufacturer of electric laboratory and industrial furnaces and ovens. Mr. Sampson formerly was district sales manager, Stewart Division, Sunbeam Corp., and recently manager, industrial furnace and oven division, Claud S. Gordon Co.

Harry L. Jenter, general superintendent, Cuyahoga Works, **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp., was named to succeed **Robert E. Cramer** as chief engineer of the company. Mr. Cramer, chief engineer since 1945, was appointed to the newly created post of chief engineer, Cyclone Fence Division, and will continue headquarters in Cleveland. Cyclone Fence has its headquarters and principal plant in Waukegan, Ill. **Floyd A. Garman** was appointed assistant chief engineer. He was formerly projects division engineer and is succeeded by **Charles B. Hull.**

Sol Predeger was appointed vice president, **Majestic Radio & Television Inc.,** Brooklyn, N. Y. He is director of purchases for Majestic and for Garod Radio Corp. A pioneer in the radio industry Mr. Predeger has served various companies for over 20 years.

Caine Steel Co., Chicago, appointed **John Brod** as manager of its St. Paul warehouse. Formerly district manager in Indiana, he is succeeded by **James K. Owen,** also appointed Ohio district manager, with headquarters in Indianapolis. Mr. Owen formerly served for 25 years with Sharon Steel Corp.

Dr. Donald M. Wroughton, Westinghouse Electric Corp. scientist who helped refine uranium for the first atomic bomb, was appointed manager of chemistry research at the Atomic Power Division to succeed **Dr. E. Bruce Ashcraft,** appointed advisory engineer in the chemical department, Westinghouse Research Laboratories, East Pittsburgh, Pa.

OBITUARIES . . .

Otto Carlson, 61, works manager, **Blackstone Mfg. Corp.,** Jamestown, N. Y., died Aug. 20. He had been associated with the company 35 years as general superintendent, and was named works manager a few years ago.

Eugene Thomas, 72, president, **National Foreign Trade Council Inc.,** died Aug. 23. He was a former vice president of United States Steel Corp., Pittsburgh. He became president of United States Steel Products Co. in 1911 and held this post until 1928. He then served as vice president, U. S. Steel Corp., in charge of sales, until 1932. One of the founders and a director of National Foreign Trade Council in 1913, he became its president in 1932, continuing actively in this post until his death.

Ransom E. Olds, 86, pioneer in automobile invention and construction, who developed the **Oldsmobile** and **Reo,** died Aug. 26. He retired in 1937. Mr. Olds invented his first gas car in 1895 in Lansing, Mich.

Edward J. Howay, former division manager, **Columbia Steel Co.,** at Seattle, died Aug. 13. He retired in 1945 after serving Columbia Steel 39 years.

Forrest A. Marsh, 48, assistant to vice president of sales, **National Tube Co.,** Pittsburgh, U. S. Steel subsidiary, died recently. Mr. Marsh started working at National Tube as a machinist helper in 1924. Prior to going to Pittsburgh, he was sales manager at the Houston office.

William J. Bowers Sr., 76, retired foundry superintendent at **American Cast Iron Pipe Co.,** Birmingham, died Aug. 21 after a brief illness.

Charles E. Dorrell, 60, president and general manager, **Russell-Harrington Cutlery Co.,** Southbridge, Mass., died Aug. 26 after a brief illness.

Allen W. Ainsworth, 45, partner in the firm of **Horace T. Potts Co.,** Philadelphia, died Aug. 13.

Advantages of EC&M TIME-CURRENT CONTROL

for cranes, larry cars, etc.

Load-controlled acceleration by TIME-CURRENT Relays. If the motor current is low, relay time will be negligible, allowing the acceleration-contactor to close quickly. Operators *appreciate this load-responsive characteristic* and *use it to advantage* when taking the swing out of the hook, spotting a load, etc.

Improved LINE-ARC Contactors cut upkeep costs. Current carrying parts and LINE-ARC principle remain unchanged, but a new magnetic circuit eliminates the magnetic-dust problem and new double-break, isolated interlocks provide safer electrical interlocking. Contact-renewal, when needed, is simple—front and rear contacts can be changed in less than two minutes—contacts are loosened or tightened with a standard wrench and without dismantling any other contactor parts.

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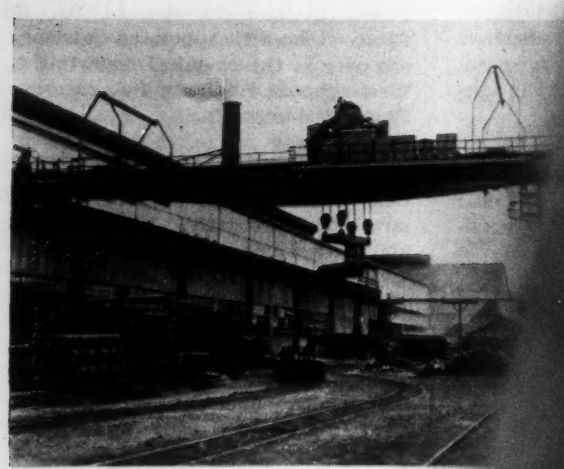
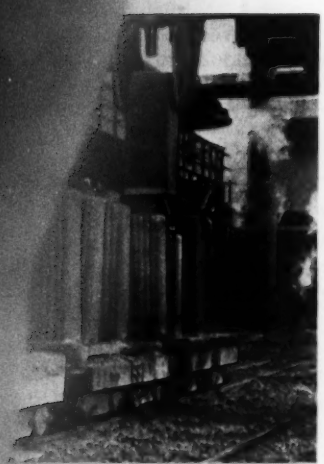


Blooms are handled by 15-ton Turntable -
Cranes, EC&M equipped.



r Crane, EC&M Controlled.

Production AND Engineering
NEWS AT A GLANCE

RUST STOPPER— Protective coatings of chromium-molybdenum alloys on iron, copper and other metals to stop corrosion now can be applied by a new process of electroplating. The method also makes it possible to apply two metals at the same time, covering irregular surfaces completely. Electrolyte used in the process is made by dissolving chromic oxide in from six to seven time its weight of water, dissolving molybdenum trioxide in this solution and adding a little sulfuric acid. Mixture, at a temperature of 100° F is then ready for use by ordinary electroplating procedures. Rights to the patent issued to Chuk Ching Ma of Orange, N. J., have been issued to Westinghouse Electric Corp.

BOTHERED WITH POROSITY?— Here's a method that eliminates porosity in small cast parts on a bulk basis. Treatment is provided by a new high pressure unit developed by Tincher Products Co., Sycamore, Ill.—handling parts such as small valve and pump housings, hydraulic brake cylinders and fittings. All internal and external surfaces are treated simultaneously by the unit either before or after machining. Procedure is simple. It consists of placing parts in a wire basket which is lowered into a tank that forces the sealing agent into all pores and voids in the castings. No evidence of impregnation remains following treatment.

FINISH WORTH INVESTIGATING— If you are looking for a utility finish with bright appearance and corrosion resistance—one that will cost you about one-fifth of a cent per square foot—you might check the new zinc bright dip developed by Chemical Corp., Springfield, Mass. Company says, the new dip may be diluted up to ten times without loss of brilliance or corrosion-resistance properties. The finish is composed of 95 per cent inorganic materials and is highly stable. It may be used in a one or two-dip cycle, the single dip giving better corrosion resistance.

GUESS WORK TAKES BACK SEAT— Elements of guesswork now are eliminated in analyzing performance of greases in ball and roller bearings. Research scientists of the Texas Co. have come up with a grease testing machine that simulates actual service conditions over a wide range of temperatures. With it, it is possible to determine changes in quality, texture, consistency and color of greases during test with the aid of high-speed stroboscopic light. Observation of the grease sample is made at 25-degree increments in temperature under the light while the machine is running at 3450 revolutions per minute.

STEAM ONLY WHEN NEEDED— Steam is made only when it is needed by the latest portable steam generator developed by Vapor Heating Corp., Chicago. The machine develops 200 pounds working steam pressure in two minutes from cold water and makes over 3500 pounds of steam per hour, at 75 to 300 pounds pressure. This is accomplished by hot gases from an efficient forced draft fuel-oil fire "wiping" over a 575-foot steel coil. Automatic controls take over once the machine is started. These turn off the machine when the predetermined steam pressure is reached; then on again when pressure drops 15 pounds.

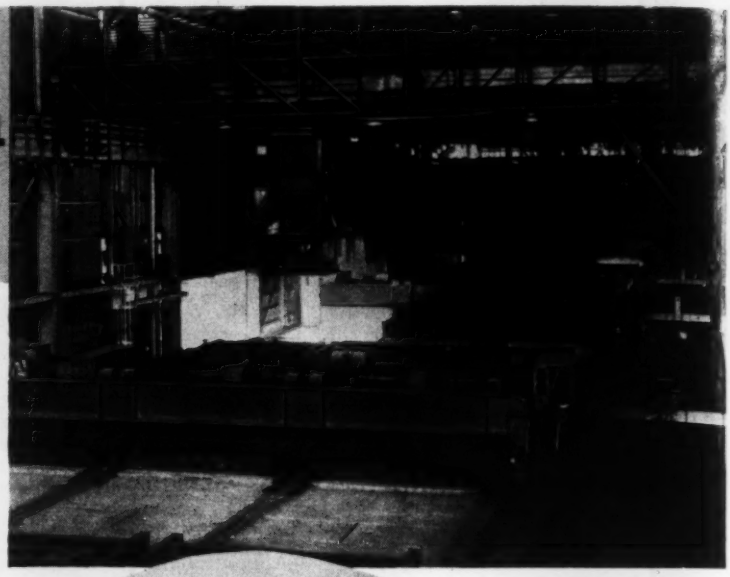
HANDLING METHOD DOES IT — Method of handling is one reason the Chevrolet - Cleveland transmission plant is able to heat treat 250 to 450 pounds of gears every 2½-hour cycle. Before being charged into the batch-type carbonitriding furnaces, the parts are arranged in layers in sheet metal boxes—separated only by wire grids. The boxes, which accommodate 144 to 1280 pieces depending on the size gears involved, then are transferred four at a time on rollers of a transfer car directly into each furnace. (p. 84)

NO PITCH DIAMETER — A new high-fatigue-resistant bolt thread form developed by Bethlehem Steel Co. may be instrumental in minimizing many failures caused by repeated loads at stresses well below those causing breakdowns under static conditions. The new thread system makes use of the maximum allowable root radius in a thread profile that results in a form that has no pitch diameter. Tests indicate that the endurance limit of bolts, studs and other threaded fasteners is increased by the development. (p.86)

FUNDAMENTAL FACTS VITAL — When cold working chromium-nickel stainless steels, all the fundamental facts known in drawing metals must be taken into consideration, says R. H. Henke of Allegheny Ludlum. In plastic deformation state, he explains, these steels tend to have a rate of work hardening far in excess of other metals, and reach much higher hardness. Modifying the composition of austenitic chromium-nickel stainless to improve their drawing characteristics, cannot make them draw like unalloyed low carbon steel or common nonferrous metals. The altered compositions can only modify the effect of the high strength and high rate of cold work hardenability. (p.88)

HARD ON THE TEETH — If you plan to friction saw nickel-base alloys, you will be interested to know that only the Hastelloy series offers real resistance to the action of the super high speed band. To saw these metals successfully and economically, it may be well to look over some of the facts uncovered by severe laboratory sawing tests. (p.91)

Advantages of
EC&M TIME-CURRENT CONTROL
for cranes, larry cars, etc.



Load - controlled acceleration by TIME-CURRENT Relays. If the motor current is low, relay time will be negligible, allowing the acceleration-contactor to close quickly. Operators *appreciate this load-responsive characteristic* and *use it to advantage* when taking the swing out of the hook, spotting a load, etc.

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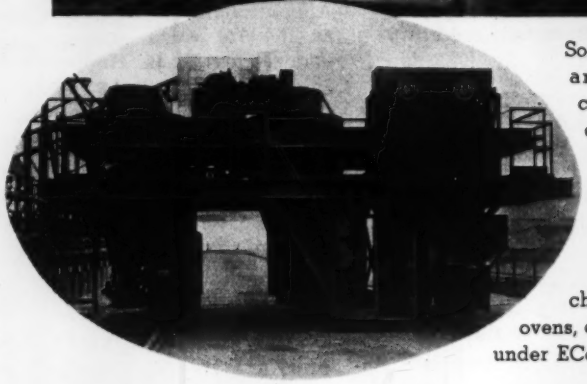
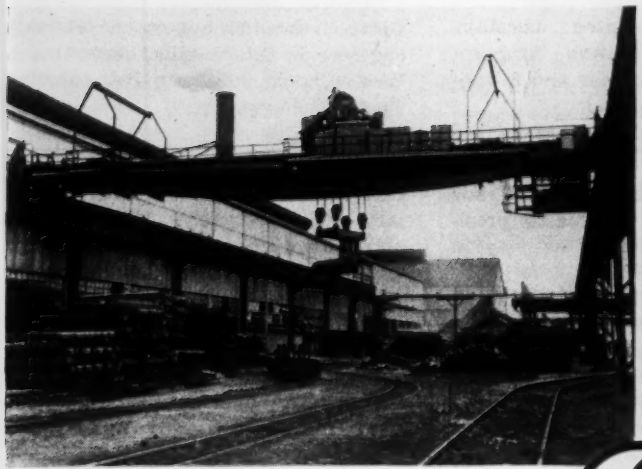


Soaking-pit cranes and pit - cover cranes, both operated by EC&M Control.

Larry Car for charging coal into ovens, operates smoothly under EC&M Control.

(TIME-CURRENT LINE-ARC CONTACTOR)



Blooms are handled by 15-ton Turntable - trolley Cranes, EC&M equipped.

200-Ton Ingot-Stripper Crane, EC&M Controlled.

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Production AND Engineering
NEWS AT A GLANCE

RUST STOPPER— Protective coatings of chromium-molybdenum alloys on iron, copper and other metals to stop corrosion now can be applied by a new process of electroplating. The method also makes it possible to apply two metals at the same time, covering irregular surfaces completely. Electrolyte used in the process is made by dissolving chromic oxide in from six to seven time its weight of water, dissolving molybdenum trioxide in this solution and adding a little sulfuric acid. Mixture, at a temperature of 100° F is then ready for use by ordinary electroplating procedures. Rights to the patent issued to Chuk Ching Ma of Orange, N. J., have been issued to Westinghouse Electric Corp.

BOTHERED WITH POROSITY?— Here's a method that eliminates porosity in small cast parts on a bulk basis. Treatment is provided by a new high pressure unit developed by Tincher Products Co., Sycamore, Ill.—handling parts such as small valve and pump housings, hydraulic brake cylinders and fittings. All internal and external surfaces are treated simultaneously by the unit either before or after machining. Procedure is simple. It consists of placing parts in a wire basket which is lowered into a tank that forces the sealing agent into all pores and voids in the castings. No evidence of impregnation remains following treatment.

FINISH WORTH INVESTIGATING— If you are looking for a utility finish with bright appearance and corrosion resistance—one that will cost you about one-fifth of a cent per square foot—you might check the new zinc bright dip developed by Chemical Corp., Springfield, Mass. Company says, the new dip may be diluted up to ten times without loss of brilliance or corrosion-resistance properties. The finish is composed of 95 per cent inorganic materials and is highly stable. It may be used in a one or two-dip cycle, the single dip giving better corrosion resistance.

GUESS WORK TAKES BACK SEAT— Elements of guesswork now are eliminated in analyzing performance of greases in ball and roller bearings. Research scientists of the Texas Co. have come up with a grease testing machine that simulates actual service conditions over a wide range of temperatures. With it, it is possible to determine changes in quality, texture, consistency and color of greases during test with the aid of high-speed stroboscopic light. Observation of the grease sample is made at 25-degree increments in temperature under the light while the machine is running at 3450 revolutions per minute.

STEAM ONLY WHEN NEEDED— Steam is made only when it is needed by the latest portable steam generator developed by Vapor Heating Corp., Chicago. The machine develops 200 pounds working steam pressure in two minutes from cold water and makes over 3500 pounds of steam per hour, at 75 to 300 pounds pressure. This is accomplished by hot gases from an efficient forced draft fuel-oil fire "wiping" over a 575-foot steel coil. Automatic controls take over once the machine is started. These turn off the machine when the predetermined steam pressure is reached; then on again when pressure drops 15 pounds.

HANDLING METHOD DOES IT — Method of handling is one reason the Chevrolet - Cleveland transmission plant is able to heat treat 250 to 450 pounds of gears every 2½-hour cycle. Before being charged into the batch-type carbonitriding furnaces, the parts are arranged in layers in sheet metal boxes—separated only by wire grids. The boxes, which accommodate 144 to 1280 pieces depending on the size gears involved, then are transferred four at a time on rollers of a transfer car directly into each furnace. (p. 84)

NO PITCH DIAMETER — A new high-fatigue-resistant bolt thread form developed by Bethlehem Steel Co. may be instrumental in minimizing many failures caused by repeated loads at stresses well below those causing breakdowns under static conditions. The new thread system makes use of the maximum allowable root radius in a thread profile that results in a form that has no pitch diameter. Tests indicate that the endurance limit of bolts, studs and other threaded fasteners is increased by the development. (p.86)

FUNDAMENTAL FACTS VITAL — When cold working chromium-nickel stainless steels, all the fundamental facts known in drawing metals must be taken into consideration, says R. H. Henke of Allegheny Ludlum. In plastic deformation state, he explains, these steels tend to have a rate of work hardening far in excess of other metals, and reach much higher hardness. Modifying the composition of austenitic chromium-nickel stainless to improve their drawing characteristics, cannot make them draw like unalloyed low carbon steel or common nonferrous metals. The altered compositions can only modify the effect of the high strength and high rate of cold work hardenability. (p.88)

HARD ON THE TEETH — If you plan to friction saw nickel-base alloys, you will be interested to know that only the Hastelloy series offers real resistance to the action of the super high speed band. To saw these metals successfully and economically, it may be well to look over some of the facts uncovered by severe laboratory sawing tests. (p.91)

News Summary—p. 53 *Market Summary—p. 121*

Twin Batch-Type Carbonitriding Furnaces Precision-Harden Transmission Pinions

Each furnace in the precision hardening installation at the Chevrolet-Cleveland transmission plant heat treats 350-450 pounds of gears on a 2½-hour cycle. Gears are machined, hardened and finished at a daily clip of 16,000

By A. H. ALLEN
Detroit Editor, STEEL

EIGHT gears comprising the planetary gearset of the Chevrolet automatic transmission must be machined, hardened and finish honed to extreme precision and in quantities now approaching 16,000 daily. They include three short pinions, three long pinions, input sun gear and low sun gear. All are machined from SAE 5145 cold-finished steel bars specified with pearlitic anneal.

As finished they must show minimum surface hardness of Rockwell A80, with core hardness of C49-52. Martensite case depth is in the range 0.007-0.010-inch, although on the bores, which are finish honed, this is reduced to a minimum of 0.002-inch.

A feature of the processing treatment at the Chevrolet-Cleveland transmission plant is the hardening installation, consisting of two side-by-side Holcroft batch-type carbonitriding furnaces, each handling 350-450 pounds of gears at a time on a 2½-hour heat treat cycle. The furnaces are flanked by pressure washers and draw furnaces, all served by a transfer car running on a track in front. Parts are loaded in boxes which are handled in groups of four.

In the machining operations blanks are formed, bored and cut off on automatic screw machines. All are straight cylindrical shape except for the short pinion which has a shank 1⅛ inches in diameter against about 2-inch diameter of the gear itself. Next the OD is finish ground, ends finish turned and chamfered, and the hole precision bored within 0.0005-inch. Chamfer is 1/32-inch at an angle of 30 degrees.

To remove toolmarks on the bore, the hole is honed and 0.002-inch stock on the diameter removed. This is done on double-spindle six-station honing machines, with automatic size-ring controls. Teeth are hobbed on an eight-spindle rotary hobber, two 1/16-inch oil holes drilled and the teeth then shaved to finish profile. Long pinions have 18 teeth, short pinions 28 teeth, input sun gear 28 and low sun gear 23. Tooth form must be true involute within plus or minus 0.0003-inch.

Parts Arranged in Layers—At this stage the gears move to the heat treating department, being stacked on spindles in wire baskets from which they are transferred to heat resisting sheet metal boxes for charging into the furnace. The parts are arranged in layers with wire grid separators. The boxes ac-

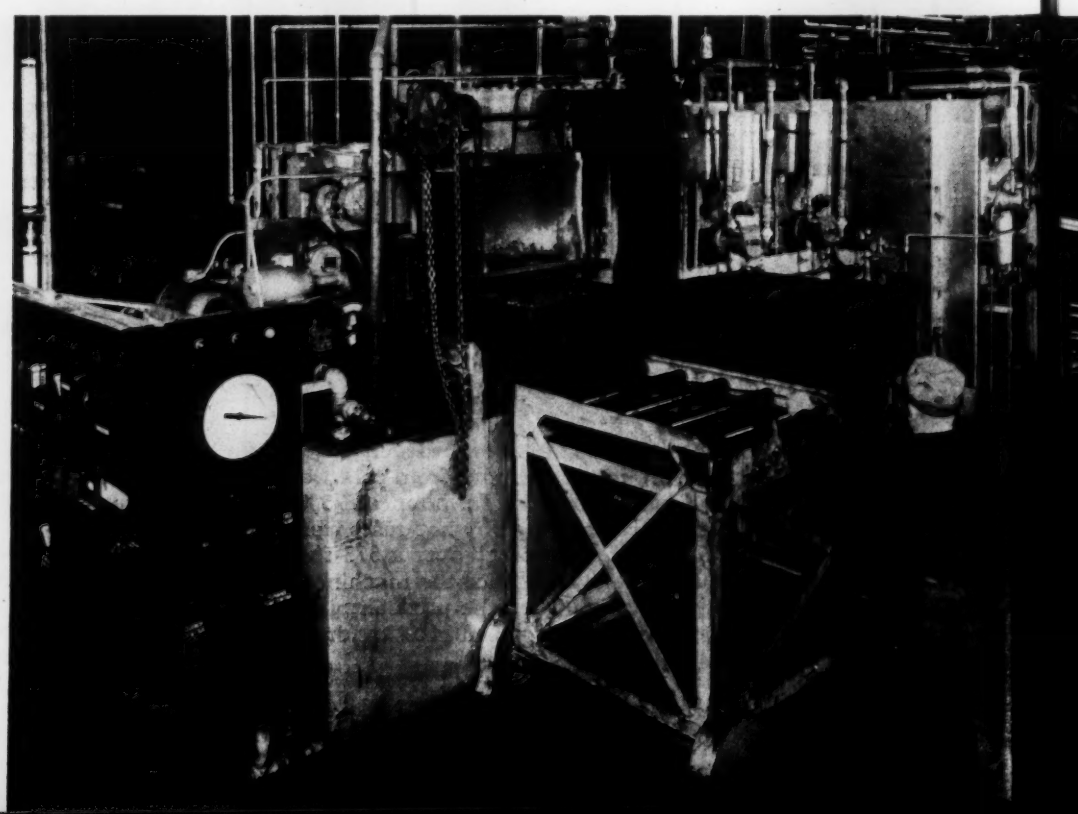

Fig. 1—Front of batch-type carbonitriding furnace, showing tray of four boxes loaded with gears entering the vestibule. Movement of boxes into heating chamber at right, return to vestibule, lowering into quench and raising for removal are all on an automatic cycle. Control panel is at left

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commodate from 144 to 1280 pieces, depending upon which gear is involved.

The boxes rest on alloy steel trays, in turn carried on five rollers mounted across the top of the transfer car. The trays, about 2½ x 3½ feet in size are light for easy handling and yet are strong enough to support loads up to 250 pounds per square foot; in addition they are flexible to avoid cracking when quenched. Fig. 1 shows a group of four boxes entering the vestibule of one of the furnaces.

Furnaces Unit-Type Construction—Each furnace is of unit-type construction, including furnace chamber, vestibule, quench tank directly beneath the vestibule, carrier gas generator (serving two furnaces) and heat exchanger for controlling temperature of the quenching oil. Operation is on an automatic cycle, although the controls may be set for independent pushbutton sequencing of the various steps.

The operator guides the tray of four loaded baskets from the transfer car into the furnace vestibule over the gravity rolls. Then he closes the vestibule door and pushes the "start" button. The cycle from here to finish is controlled electrically to govern the length of flushing time, furnace time and quench time, all of which are present on the control panel to the left of Fig. 1.

When the vestibule flushing period is over, the inner furnace door opens and transfer racks operated through pinions move out under the tray. Reference to the drawing in Fig. 3 shows the relation of vestibule to furnace. The elevator, in the "up" position, lowers the tray carrying the load onto the rack which then moves back into the furnace and the door closes. Note that the trays are neither pushed nor pulled, once inside the vestibule. Since the vestibule was flushed prior to the furnace door opening, the atmosphere surrounding the parts is completely free of contaminating gases.

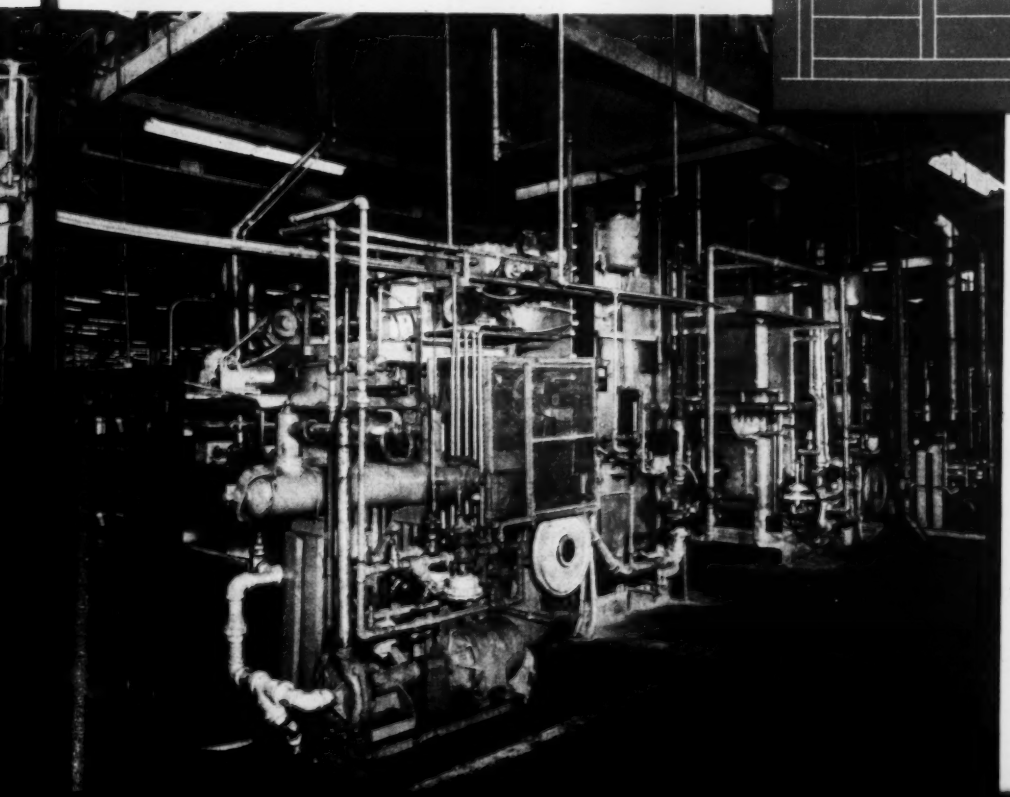
"Temperature Head" Built up—Heating temperature is 1530° F and time is 1 hour and 15 minutes. A feature of the furnace is that a "temperature head" is built up to around 1620° F before the boxes enter the chamber to avoid a drastic temperature drop with the entrance of a cool load, thereby reducing the length of time in the furnace. Even so, when the load first enters, a temperature drop to around 1300° results, but this is quickly brought back to 1530°.

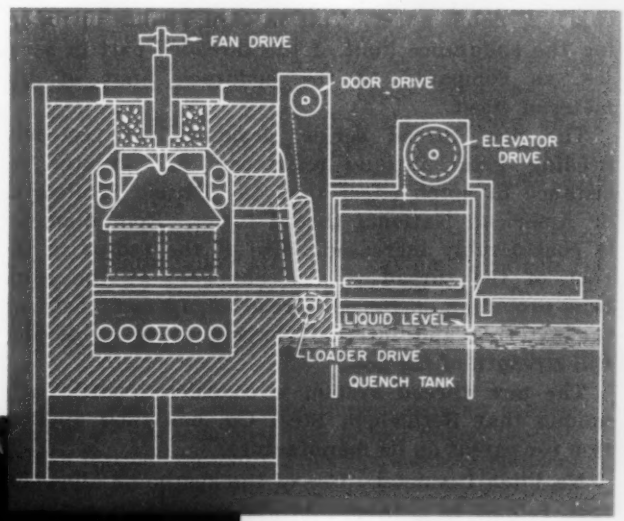
At conclusion of the (*Please turn to Page* 104)

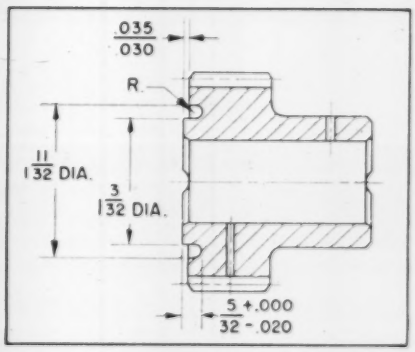
Fig. 2 (below)—Rear view of double furnace installation suggests compactness of the units. In the foreground is a heat exchanger which keeps quenching oil in the temperature range of 125-130°F. Approximately 400 pounds of gears are heated, quenched, washed and drawn by each furnace on a 2½-hour cycle

Fig. 3 (right)—Schematic drawing of furnace shows arrangement of vestibule, elevator, heating chamber and quench tank. Pump circulates oil in the quench tank and a heat exchanger regulates its temperature

Fig. 4 (right, below)—Cross section of short pinion shows position of ¼-inch groove cut in one face to avoid distortion in heat treatment resulting from differential in cooling rate between two thicknesses of section







New Thread Form Reduces Bolt Breakage

Endurance limit of bolts, studs and other threaded fasteners is remarkably increased by a new high fatigue resistant thread system designed to minimize "notch effect"

By ANDREW SCHWARTZ Jr.
Metallurgical Contact Engineer
Bethlehem Steel Co.
Lebanon, Pa.

FAILURE of threaded parts under repeated loads, at stresses well below those causing failure under static conditions, may be minimized by the development of a new high fatigue resistant thread form.

In too many cases of severe services, bolts are expected to break with a certain frequency. Why? Because bolts, studs and other fasteners with relatively sharp threads are products in which the threads create a notch effect. This in turn results in lowering the endurance limit of the threaded part in service, as compared to the endurace limit of the material itself.

The new thread series, designed for fasteners needing great fatigue resistance, has greater resistance to notch effect than the British Whitworth or American National thread forms. Root diameter is considerably increased. Size of the radius in the root of the thread is also changed, at the same time providing sufficient thread engagement between the external and internal threads so as to develop full strength of the bolt.

The new thread system is considered sufficiently unique that Bethlehem Steel Co. has filed application for patent on its manufacture.

No Pitch Diameter—Use of the maximum allowable root radius in a thread profile results in a thread form which has no pitch diameter, under the commonly accepted definition of this term. "Pitch diameter" is defined as "the diameter of an imaginary cylinder, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cylinder."

As will be noted, Fig. 1, the 60 degree thread angle of the American National form is maintained. Height of thread is materially reduced in comparison to the two standard profiles shown. This is a result of the necessity of increasing the radius at the root of the thread to a maximum, in order to minimize the notch effect inherently common to the usual thread form.

The increased stress of the resultant threaded section materially increases the load-carrying capacity. Full section stripping tests on high-fatigue resistant threaded bolts and nuts have shown that more than sufficient depth of thread engagement is provided to insure freedom from stripping of threads in assembly. These tests have been confirmed by many thousands of high-fatigue resistant threaded bolts and nuts in severe service without a single reported failure by stripping of threads.

Stress Raisers Get More Attention—The adverse effect of stress raisers, such as threads, has been recognized as demanding more attention by the bolting industry, in view of the increasing requirements for higher stresses and speeds, with the resultant increase in the frequency of fatigue failures.

Failures happen in service in which no perceptible stretching of the bolt occurs. These fatigue failures occur at loads which are no greater than those that are frequently encountered during normal service.

Appearance of the typical fatigue fracture usually shows a spot or nucleus from which point the crack progresses until the piece finally breaks. It consists of a smooth section where the two surfaces rubbed together before fracture, and a rough section, which was the area at the point of actual fracture and shows the grain structure of the metal. This type of fracture is sometimes given the misnomer, "crystallization".

Fatigue Tests Run—A series of fatigue tests of the new thread form were run using a R. R. Moore high speed rotating beam machine at 10,000 rpm and with the thread form superimposed on a modified standard test specimen by grinding in a Jones and Lamson thread grinder, as shown in Fig. 2.

Test pieces with the high-fatigue resistant form as well as similar specimens of the American National form, coarse and fine, and the British Whitworth form, were ground from fully normalized blanks of medium carbon basic open-hearth, killed steel, analyzing C 0.45; Mn 0.62; P 0.12; S 0.046 and Si 0.22 with incidental alloying elements being nil except Cr 0.03. Mechanical properties of this material after normalizing were as follows:

Yield Point	63,000 psi
Tensile Strength	97,500 psi
Elong. (2")	23.0 %
Red. of Area	46.2 %

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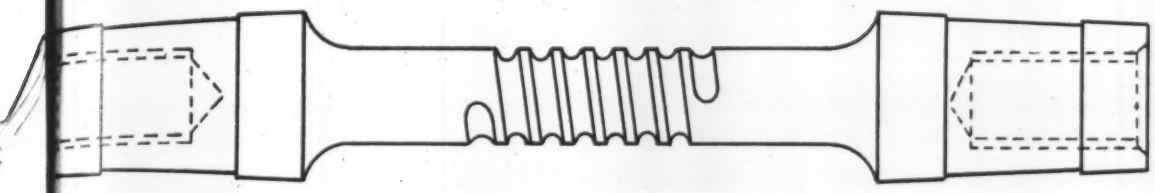


Fig. 1 (left)—High fatigue resistant thread form (B) shown in scale with the American National (A) and British Whitworth (C) form of threads

Fig. 2—High fatigue resistant thread form fatigue test specimen

To correlate the effect of the thread profiles on the four different depths and forms of threads, sets of specimens of each thread form in which the major diameter of the thread was held constant were run with a resultant variation in the minor diameter. By use of a 5/16-inch threaded section, size of the finished threaded test pieces are within the capacity of the standard fatigue machine and also are representative of the relative merits of the various thread forms in actual service. Thread data of test pieces, which are also applicable to bolt threads of 5/16-inch diameter, are shown in accompanying table.

THREAD DATA OF TEST PIECES RUN ON MOORE MACHINE

Thread Form	Major Diameter	Minor Diameter	Thread Depth
5/16"—12 HFR	0.3125"	0.2463"	0.0331"
5/16"—18 NC	0.3125"	0.2403"	0.0361"
5/16"—24 NF	0.3125"	0.2583"	0.0271"
5/16"—18 BSW	0.3125"	0.2413"	0.0356"

Enurance Limits Established — Fatigue endurance curves in Fig. 3 show the relative effect on the endurance limit* of the four thread profiles, when 5/16-inch threads of the high-fatigue resistant form (12 pitch); American National coarse form (18 pitch); American National fine (24 pitch); and British Standard Whitworth form (18 pitch) are tested, maintaining a constant major diameter of each thread.

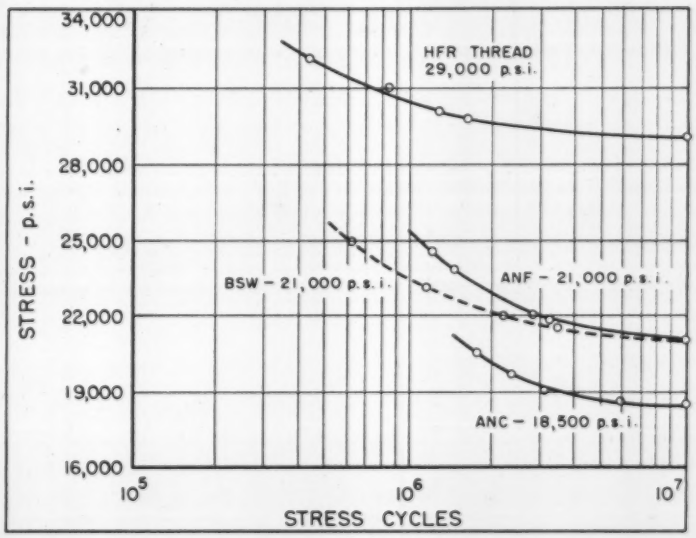
Standard unthreaded fatigue specimens of this material show an endurance limit of 40,500 psi or an EL/TS ratio of the endurance limit to the tensile strength of 41.8 per cent. Comparison of the curves in Fig. 3 indicate that the endurance limit of the high-fatigue resistant thread form more closely approaches the value obtained on the plain standard test for the material. The American National coarse thread form resulted in the lowest endurance limit of 18,000 psi (EL/TS ratio of 19.1 per cent), while the American National fine thread and the British Standard Whitworth forms endurance limits were alike at 21,000 psi (EL/TS ratio of 21.6 per cent) compared to the endurance limit for the high-fatigue resistant form of 29,000 psi (EL/TS ratio of 30.0 per cent). All of the stress areas were calculated using the root areas of each of the respective thread forms.

Minor Diameter Held Constant—To determine the comparative notch effect of the different thread forms and to eliminate the effect of the difference in thread depths, test specimens were prepared on which the minor diameter was held constant and the major diameter of the resultant thread varied with the different thread forms. Results of testing such specimens for a cycle of ten million stress reversals showed an EL/TS ratio of 27.4 per cent for the high-fatigue resistant thread form as compared to 17.5 per cent for the American National form thread, and 20.2 per cent for the British Whitworth. The N-S ratio (notch sensitivity) of the three thread forms was in the order of 1.53 for the high-fatigue resistant form, 2.31 for the American National form, and 2.08 for the British Whitworth form.

Withstands Severe Service Trials—To submit this new thread form to a thorough, practical and most severe test, permission was obtained to place bolts and nuts having the high-fatigue resistant thread form in use as the fastener holding the guard rail to the running rail in high speed subway service. Variable stresses encountered in holding these rails in position is one of the most severe types encountered, due to the high frequency of traffic, short curves, changing of acceleration on the curves, together with the high center of gravity of the variable loaded cars. Fatigue failures of guard rail bolts have been common, with a tensile failure practically never occurring. A heat treated alloy steel bolt having American National Coarse thread form had been used for some years.

On several thousand bolts (*Please turn to Page* 94)

Fig. 3—Fatigue endurance curves showing relative effect on the endurance limit of four thread profiles, high fatigue resistant (12 pitch), American National coarse (18 pitch), American National fine (24 pitch) and British Standard Whitworth (18 Pitch)



* Endurance limits of ferrous materials are usually defined as the maximum limit of repeated stress at which failure will occur during a specified large number of cycles of stress. For steels, a life of 10 million cycles is commonly accepted as a reasonable assurance that the endurance limit has been reached. Most commonly used test of endurance limit employs a rotating beam-type machine as designed by H. R. Moore.

Allegheny Ludlum Analyzes

Drawing Characteristics of S

FUNDAMENTAL facts concerning the drawing of hollow shells from flat metal blanks apply to all metals. Stainless steels, however, have considerably higher strength than carbon steel or nonferrous metals usually drawn or formed. During working in plastic deformation, stainless steels tend to have a rate of work hardening far in excess of these other metals and reach much higher hardnesses.

Nonferrous materials, such as deep drawing brass and unalloyed, low carbon, deep drawing steel, have the property of work hardening during the initial stages of plastic deformation. Upon further cold work the hardness arrives at a maximum value and considerable cold work can be performed without much further increase in hardness. The ferritic stainless steels, such as type 410 and 430, behave in much the same manner if the higher initial hardness and physical properties of the annealed stock is taken into consideration.

Austenitic Stainless Different—Austenitic chromium-nickel stainless steels, most common of which are the 18-8 grades, differ greatly from any other metals commonly drawn or formed. These steels have relatively high annealed yields. Their tensile strength increases rapidly during plastic working and does not tend to approach a maximum beyond which plastic deformation can be performed without much increase in hardness. With each increase in the amount of plastic deformation, the austenitic chromium-nickel stainless steels become progressively harder and hardnesses in excess of 40 Rockwell C have been produced in drawn parts. Four commercial variations of 18-8 chromium-nickel stainless steels and three ferritic chromium stainless steels are commonly used in the drawing and forming industry. Analyses of these steels are shown in Table 1.

Yield Strength Related to Carbon Content—Major variations in chemical analysis for the AISI 300 series are in carbon and nickel contents. By varying these, keeping the chromium content at approximately 18 per cent, a wide range of alloys can be produced which will have properties ranging between a relatively soft, low work hardening alloy to compositions having high annealed strength and a very high rate of cold work hardenability. This effect of composition can best be illustrated by studying the data given in conjunction with Table II.

It is evident that the yield strength is directly related to the carbon content of the alloy; the higher the carbon, the higher the annealed yield strength. An alloy with a carbon content of 0.11 per cent has a yield strength of 45,370 psi while an alloy with a carbon content of 0.053 per cent has a yield strength of 33,800 psi. Alloys with varying carbon between 0.053 and 0.11 will vary in yield strength between these approximate limits.

Cr-Ni Ratio After Plastic Deformation — After plastic deformation begins, the chromium-nickel ratio determines the ultimate strength and ductility. Wide variations in tensile strength and ductility can be obtained by varying this ratio. In steels with a low chromium-nickel ratio, and high nickel content, low tensile properties are obtained. With alloys of a high chromium-nickel ratio and low nickel content, high physical strength and ductility are obtained.

These variations in the ductility and strength of the chromium-nickel stainless steels are caused by the effect of the balance between the chromium and nickel content upon the rate of cold work hardenability. High nickel steels such as type 305 have a low rate of cold work hardenability while low nickel steels such as type 301 stainless steel have a very high rate of cold work hardenability.

During plastic deformation all metals will cold work to some degree through straining the crystal lattice. In steel, such as type 305 stainless steel having high nickel content, the increase in properties produced by cold working is only that normally produced in any metal. However, when cold working the chromium-nickel stainless steels, such as type 301 or 302, the normal increase in properties in cold working is added to by a phase change and very high hardnesses and tensile properties are produced.

Composition Affects Stability—This marked effect of composition on the mechanical properties of the chromium-nickel stainless steels is the result of slight changes of composition affecting the stability of the austenite and its tendency to transform into ferrite in the vicinity of room temperature . When the chromium-nickel stainless steels are annealed, they are generally heated in the range of 1950-2050°F and cooled rapidly in air or water. This rapid cooling produces a metastable alloy at room temperature consisting of 100 per cent austenite.

Sections of the ternary diagram for chromium-nickel-iron are shown in Fig. 1. Iron content is held constant at 70 and 75 per cent with the chromium and nickel varying along the abscissa and temperature varying along the ordinate. These two cross sections show that when the nickel content exceeds 11 per cent, the alloy at room temperature consists of a stable austenitic structure with no tendency to form ferrite. However, when the nickel content drops below 11 per cent, there is a tendency for ferrite to form in the vicinity of room temperature and the rate of formation increases with decreasing nickel

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# of Stainless Steels

content. Type 301 stainless steel will have a higher rate of cold work hardenability than type 302 while type 305 will have the lowest possible work hardening rate for these steels.

For example, consider an alloy on the 75 per cent iron diagram containing approximately 17.5 per cent chromium and 7.5 per cent nickel. From approximately 1100°C, the annealing temperature, down to 100°C the alloy is completely austenitic. However, below 100°C the stable structure should consist of a mixture of austenite and ferrite. In the annealed condition, such an alloy would exist at room temperature in the completely austenitic condition because at the low temperature, 100°C, it is too sluggish to transform.

Alloy Reverts to Stable Condition—When an alloy such as this is subsequently plastically deformed, the energy imparted to the structure is sufficient to cause the alloy to revert to a stable condition consisting of austenite and ferrite which causes an exaggerated increase in hardness and physical properties over that which occurs in a stable austenitic structure such as Type 305 stainless steel.

This point is illustrated in Table II which shows that the relatively unstable alloys such as type 301 develop very high tensile properties due to the increase in strength brought about by the high rate of cold work hardening. Also, as the nickel content is increased to reduce the rate of cold work hardening,

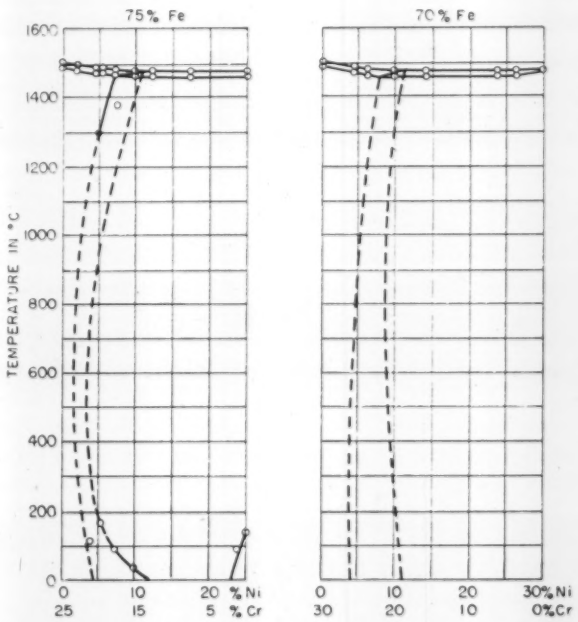

Fig. 1—Cross sections of equal iron content through the three component systems, iron-chromium-nickel. From Wever and Jellinghaus, *Mitt. Kais.-Wilh.-Inst. Eisenf.*, Vol. 13, p. 103, 1931

Fig. 2 (right)—Photo of cup XX-4 (type 302 annealed) which is an example of a successful draw. Note elongation of the A-L star on its surface toward the left. Drawn according to conditions described in Table III

TABLE I
CHEMICAL COMPOSITION RANGES OF STAINLESS DRAWING STEELS

AISI Type No.	C	Mn	Si	Cr	Ni
301	.08/.20%	2.00% Max	1.00% Max	16.00/18.00%	6.00/8.00%
302	.08/.20%	2.00% Max	1.00% Max	17.00/19.00%	8.00/10.00%
304	.08% Max	2.00% Max	1.00% Max	18.00/20.00%	8.00/11.00%
305	.12% Max	2.00% Max	1.00% Max	17.00/19.00%	10.00/13.00%
410	.15% Max	1.00% Max	1.00% Max	12.00/14.00%	.....
430	.12% Max	1.00% Max	1.00% Max	14.00/18.00%	.....
446	.35% Max	1.50% Max	1.00% Max	23.00/27.00%	.....

TABLE II
EFFECT OF COMPOSITION ON ANNEALED TENSILE PROPERTIES

Type No.	C	Cr	Ni	0.2% Offset Yield Strength	Tensile Strength	% El-in 2"
301	0.11	17.90	6.72	45,370	146,900	72.5
302	.087	18.19	8.92	40,360	92,670	61
304	.068	19.15	9.25	36,920	85,550	59
305	.048	17.05	11.79	33,750	79,160	51
16-14	.053	16.50	14.60	33,800	79,060	50

TABLE III
PROPERTIES OF CUP SECTIONS DRAWN FROM TYPE 302

C-.11, Mn-.42, P-.018, S-.009, Si-.34, Cr-18.97, Ni-9.50.
57% warm (300-400° F); draw at 1-2 fpm, draw ring 0.5" radius, 6.380" I.D.; punch 0.75" radius 6.000 diameter. Holddown pressure 24 tons, ram pressure 79 tons.

Inches from Bottom	Thickness	Circumferential Properties Yield Strength	Tensile Strength	% Elong. in 2"	Hardness Rc
7	.102	.....	.....	...	..
6-5/16	.093	106,600	145,400	10.5	37
5-1/2	.084	110,600	144,300	12.0	35.5
4-11/16	.080	108,700	140,800	12.5	34.5
3-7/8	.077	104,000	136,700	10.5	32.5
3-1/16	.075	98,300	128,600	13.5	29
2-1/4	.073	94,100	118,900	18.5	27.5
1-7/16	.071	87,800	110,800	31.0	25
1/32	.066	93,200	112,800	31.0	26.5
Properties of material originally shipped (annealed)	Long	42,440	90,030	57.0	80-82 RB
	Trans	42,710	90,330	57.0	80-82 RB

the tensile and yield strength gradually decrease to a minimum. In a fully austenitic composition, further increase in nickel content causes no further reduction in strength or rate of work hardening. For example, comparing the tensile properties of type 305 and the 16 per cent chromium—14 per cent nickel alloy, a 2.8 per cent increase in nickel does not cause any change in the tensile properties.

Hardenability Proportional to Ductility—Rate of cold work hardenability is also directly proportional to the ductility of these steels. When an alloy having a relatively unstable structure is plastically deformed, such as in tensile test, the specimen will resist local "necking" since the physical properties of the alloy increase so rapidly with cold working that the "necked" area soon has a load-carrying capacity greater than the remainder of the specimen.

This causes uniform stretching over the entire gage length and results in high total elongation figures. A stable austenitic structure on the other hand which does not have a high rate of cold work hardenability cannot increase in physical properties sufficiently to resist necking. Consequently, there is a reduction in ductility as well as in the degree of uniform elongation. This is quite apparent when studying Table II.

The 18-8 stainless alloys vary so greatly in plastic characteristics that one type would be satisfactory in a certain application while another would not. For this reason, it is extremely important to consider chemistry as set up by AISI ranges as well as mechanical properties in determining which alloy to use.

Consider purchasing steel to make a round cup requiring a 45 per cent draw, if only annealed mechanical properties were specified without consideration of a composition range. All of the alloys we have discussed would probably draw satisfactorily. However, the type 301 steel would become very hard because of its very high rate of cold work hardenability and there would be danger of stress cracking.

The low work hardening alloys such as types 305 and 16-14 may not have a rate of work hardening which is high enough and the walls of the vessel would not be able to withstand the stress necessary to draw in the blanks. Types 302 and 304 on the other hand are alloys which are a compromise between low yield strength and high tensile strength which have a moderate rate of cold work hardenability, are strong enough to draw in blank and should be satisfactory from the stress cracking standpoint.

Cold Work Hardenability High—Even though it is possible to control the annealed physical properties and rate of cold work hardenability through composition control, it should be borne in mind that even the softest of the chromium-nickel stainless steel compositions, (low carbon-high nickel) still have an initial hardness and rate of cold work hardenability considerably in excess of those other materials normally drawn. Thus, modification in composition of the austenitic chromium-nickel stainless steels with the object of improving their drawing characteristics, cannot make them draw like unalloyed low carbon steel or common nonferrous metals. These altered compositions can only modify the effect of the high strength and high rate of cold work hardenability of the regular 18-8 stainless steels.

Fundamentals Important—Several well-established drawing fundamentals will help in the discussion of drawing stainless steels. In drawing a round blank over a draw ring, the stress pattern in the draw piece is such that the tensile stresses in the wall of the sheet are due directly to the pressure of the punch on the bottom of the cup. If the resistance to drawing set up in the flange becomes too great, the tensile stresses in the side wall exceed the stresses at which necking occurs and the bottom is torn out.

In the flange, the crowding of metal sets up compressive stresses as the blank is reduced and it is these compressive stresses in the flange which tend to cause wrinkling and which determine the amount of tensile stresses the side walls must transmit. The wider the flange the higher the tensile stresses in the side must be in order to move the metal in the flange. Also, the higher the compressive resistance of the metal to cold working the higher will be the tensile stresses in the wall. (*Please turn to Page* 96)

TABLE IV
PROPERTIES OF CUP SECTIONS DRAWN FROM TYPE 301

C-.11, Mn-.82, P-.021, S-.008, Si-.43, Cr-17.92, Ni-6.67.
57% warm (300-400° F); draw at 1-2 fpm, draw ring 0.5" radius, 6.380" I.D.; punch 0.75" radius 6.000" diameter. Holddown pressure 24 tons, ram pressure 100 tons.

Inches from Bottom	Thickness	Circumferential Yield Strength	Properties Tensile Strength	% Elong. in 2"	Hardness Rc
6-5/8	...	.....	.....	...	43
5-3/4	.093	.....	.....	...	43
4-7/8	.087	126,900	162,300	14.0	41.5
3-11/16	.082	120,500	153,300	15.5	39.5
2-9/16	.079	108,300	138,100	22.5	37
1-7/16	.078	96,200	127,600	41.5	32.5
1/32	.072	108,000	144,500	32	34.5
Properties of material originally shipped (annealed)		Long 49,640	133,750	50.0	88-90 RB
		Trans 52,430	116,150	50.0	88-90 RB

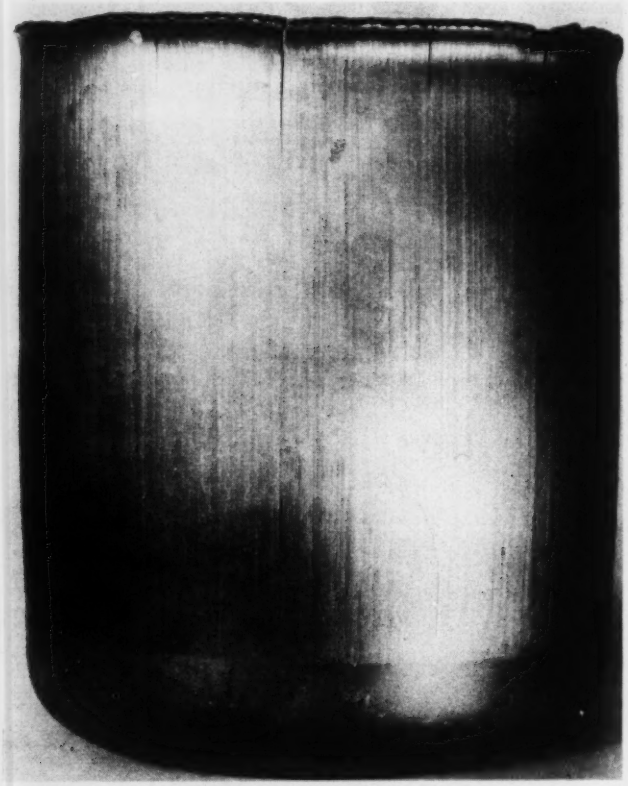

Fig. 3—Cup W-1 (type 301 annealed) showing longitudinal cracks. Drawn according to conditions described in Table IV

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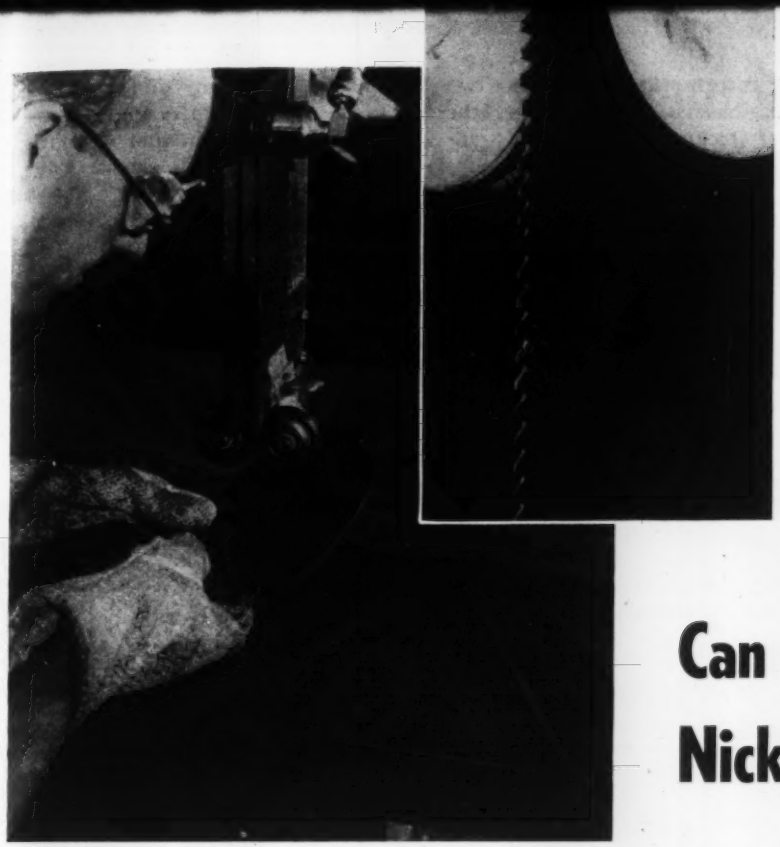


Left — Friction sawing ⅝-inch section of Inconel at a velocity of 9000 fpm. A cutting rate of 28 lineal inches per minute is possible by "rocking" the piece as shown to present a continuous thin section to the band for rapid heat concentration

Right — New friction sawing band reaches its peak efficiency only afer the teeth have worn down as shown. Thereafter, by increasing the velocity according to material thickness increase, the band will generate the necessary frictional heat for as many as 6 hours of continuous cutting on ½-inch sections of cast Monel

Can You Friction Saw Nickel-Base Alloys?

Severe laboratory sawing tests reveal that Monels, Inconels, Hastelloys and Illiums are successfully cut by high speed band friction methods. Economic use of these techniques depends upon several factors

By H. J. CHAMBERLAND
Research Engineer
The DoAll Co.
Des Plaines, Ill.

NICKEL-BASE alloy materials, Monels, Inconels, Hastelloys and Illiums, can be successfully cut by band friction sawing. Results of recent severe laboratory sawing tests show that only the Hastelloy series offers real resistance to the super high speed band. All tests were executed with a precision 1-inch —10 pitch—0.057-inch Raker set— "A" temper precision sawband. Only straight cuts are concerned for determining most reasonable cutting rates commensurate with economy of saw life. Irregular cuts, especially with a narrower band will result in decreased production all depending on the intricacy of outlines involved. Likewise, and more or less unprofitably, cutting rate can be increased at the expense of saw life.

Monel H-K-R-S-Wrought and Cast — The following test on type K applies to all related types. The material is 3/16-inch thick and velocities from 9000 to 12,000 fpm were tried to establish the most effecient. A velocity of 10,000 fpm, with a medium band feeding pressure, gave the surprising cutting rate of 43 lineal inches per minute and a good finish.

These alloys vary only slightly in nickel content, 63-67 per cent, but only types K, R and wrought Monel are free from silicon. Of the remaining types, only two would be likely to affect saw life more or less and these are H and S with respective silicon contents of 3 and 4 per cent. All Monel metals may be accepted as excellent friction sawing applications providing material thickness limitations are taken seriously.

Inconel—This nickel-base alloy is still a better friction sawing application than Monel because a cutting rate of 72 lineal inches per minute is possible on a 3/16-inch section, regardless of its high nickel content of 79.5 per cent. It is obvious that such a cutting rate is no comparison to the maximum possible by conventional sawing procedure. A ¾-inch section can be friction cut ten times faster than a ¼-inch section at the regular speed of 125 fpm.

The thickness mentioned requires a saw velocity of 9000 fpm and medium hand feeding pressure. Finish of cut is good, except for the usual slight under-burr which can be readily removed by band filing. Many users of friction sawing equipment use a band filing machine to remove any objectionable burr although it seldom exceeds 1/16-inch. This is a sound policy since the file band is from ten to 15 times more productive than a hand file. Life of the friction sawband is most reasonably long for cutting sections under ½-inch and surprisingly so for sections under ¼-inch.

Hastelloy A-B-C-D—This test consists of cutting B plate and is one of the most severe likely to be encountered in the course of friction sawing practice. The respective nickel base of these alloys are, in

their order, 56, 62, 58 and 86 per cent; these are conservative figures. A high nickel content by itself has no material effect on the cutting action. However, the substantial molybdenum content of 32 per cent in Hastelloy B, added to the fact that the 1 inch thickness is the practical maximum, should account for exceptional saw resistance.

Melting points of the nickel base alloys do not enter into the picture since they vary only slightly. Regardless, it is significant to note that a cutting rate of 3 lineal inches per minute is made possible with a saw velocity of 12,000 fpm and making use of the screw feed attachment of the machine for uniform work pressure and maximum heat concentration.

Same Reaction for A and C Types—Hastelloy A and C types would, with their respective molybdenum contents of 22 and 19 per cent, likely react the same as B and with as satisfactory a cutting rate. All Hastelloys have silicon contents; but with A, B and C types it is negligible and of no relative concern. Friction sawing conditions are altogether different with type D with its 10 per cent silicon content which is considered high as effecting tool life. The more silicon the greater the wear resistance of the metal but the greater its abrading action on the saw or any other type of cutting tool.

No friction sawing data are available on type D. However, relying on experience as a yardstick it can be assumed that in this case there can't even be a fair compromise between saw life and cutting rate for sections exceeding 3/8-inch. In this particular instance the conventional sawing procedure cannot and should not be ignored even at a great sacrifice of cutting rate. With the two previous base-alloys considered the material thicknesses were only 3/16-inch. Any increase in thickness requires a relative increase in saw speed and a decrease in cutting rate results.

While the cutting rate on Hastelloy B would gradually rise to approximately 25 lineal inches per minute on 3/16-inch plate, on the other hand the 3/16-inch Inconel cutting rate would gradually drop to 13 or 14 lineal inches per minute on a 1-inch thickness.

Illium G and H—These two nickel-base alloys have somewhat the same cutting characteristics as Hastelloy A, B and C. Friction sawing production rates should be similar. The nickel contents of both are in balance except that the molybdenum contents of the Illiums are only respectively 6 per cent and 5 per cent but the difference is made up with the addition of 21 per cent chromium to both types. The silicon content of both is also negligible and the change from molybdenum to chromium as a secondary alloying element creates no difference in cutting action.

Requires Heavy Feeding Pressure—A test on type H of a 5/8-inch thickness shows that a velocity of 10,000 fpm will result in a cutting rate of 13 lineal inches per minute with a minimum of saw wear. This material requires a heavy feeding pressure and preferably the use of a machine equipped with an auxiliary table hydraulically operated, if the material is to be cut on a substantial basis.

Reducing the velocity to 6000 fpm will likewise reduce the cutting rate to 10 lineal inches per minute. Another test of 15,000 fpm increased the cutting rate to 22 lineal inches per minute. Considering the fact that the 13-inch cutting rate is approximately 40 times faster than that of conventional sawing, saw life should certainly not be unduly sacrificed.

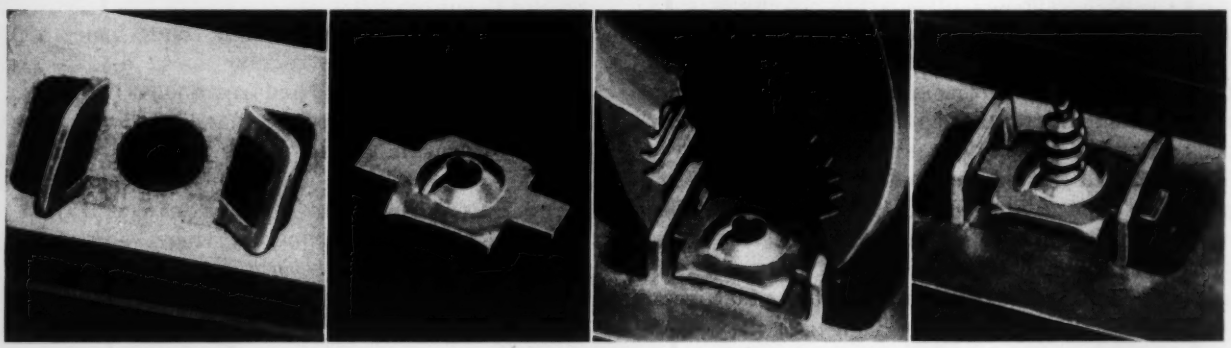
Ten or 14-Pitch Bands Needed—Friction sawing requires bands of 10 or 14 pitch; 18 pitch bands are seldom used and the 10 pitch predominates. For contour friction cutting, saws narrower than 1/2-inch should be used only upon recommendations from engineers in this field. Velocities for the various steel alloys, material thickness considered, vary but slightly.

Most sections under 1/8-inch require the minimum velocity of 3000 fpm, with velocity increases to 8000 fpm for 1/4-inch sections, 8000 fpm for 3/8-inch, 10,000 fpm for 1/2-inch and so on until the 15,000 fpm maximum is reached to cut some of the 1-inch sections. These saw speeds should be accepted as stepping stones only, noting that 3/16-inch Monel is cut at 10,000 fpm and a similar Inconel thickness at 9000 fpm.

On the thicker sections, and particularly with the high chromium, vanadium and tungsten alloys, saw resistance when starting to cut is usually strong but it will start penetrating within a few seconds and the material will continue to respond satisfactorily if the feeding pressure is uniformly maintained for continuous heat concentration.

No Guesswork in Packaging

Selection and use of corrugated and solid fiber shipping cases is removed from the realm of guesswork by an eight-page technical service bulletin issued by Paisley Products Inc., Chicago.



NO SEPARATE CAGE FOR NUTS: Instead of welding a separate cage to the part for a floating nut, Prestole Corp. of Toledo, O., is now going to let you punch the cage in the sheet metal. System is used with a cage nut which is locked in place by dropping it over the two loops (left photo), prepunched at 45 degrees. Nut (next photo) is "pinched in" by ordinary pliers (third photo). Nut is produced to fit most sizes of sheet metal screws, being made of spring or mild steel, depending upon torque requirements. Conical-shaped impression in nut (right photo) is said to provide a 360 degree thread-grip on the screw thread

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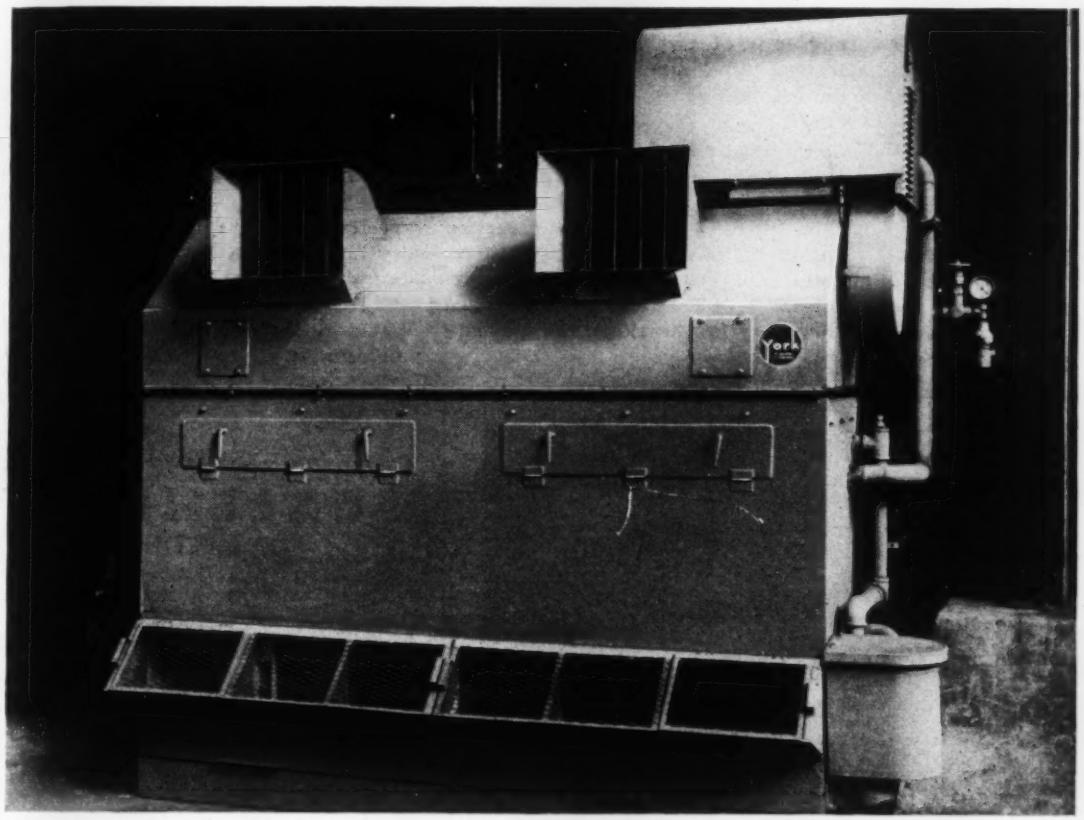
The York Water Economizer, equipped with Revere Copper and Brass Fittings to guard against corrosion and assure trouble-free operation, will save you up to 95% on water.



FOR many years Revere has furnished the York Corporation, York, Pa., with copper and brass for use in its air conditioning, refrigeration and heating equipment. Engineers at York tell us that during that time they have learned to depend on Revere Products for high quality and uniformity of metal, correct temper, and strict adherence to specifications.

It was this satisfaction with Revere over the years that led York engineers to specify Revere Products for the York Water Economizer. The brass spray nozzles and copper water and refrigeration tube with which this unit is equipped assure constant, trouble-free protection against that efficiency-destroyer which is ever-present when water and metals get together . . . corrosion.

This is a mighty important thing for York, and a mighty important thing for present and prospective owners of air conditioning and refrigeration equipment. The York Economizer itself is a mighty important unit right now, too. For, with water a most critical item in many sections of the country, both from the standpoint of supply and disposal facilities, the York Water Economizer makes it possible to save up to 95% of the amount of water normally required. On a typical installation of 100 tons of refrigeration capacity, for example, 17,100 gals. of water can be saved every hour of operation!

York also uses Revere Copper and Brass products in its water coolers, for cooling coils, chilled water piping, and other component parts of its air conditioning systems.

Perhaps there is a Revere Metal or alloy that you can use to advantage in your product. Why not call the nearest Revere Sales Office and see?

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New Thread Form

(*Concluded from Page* 87)

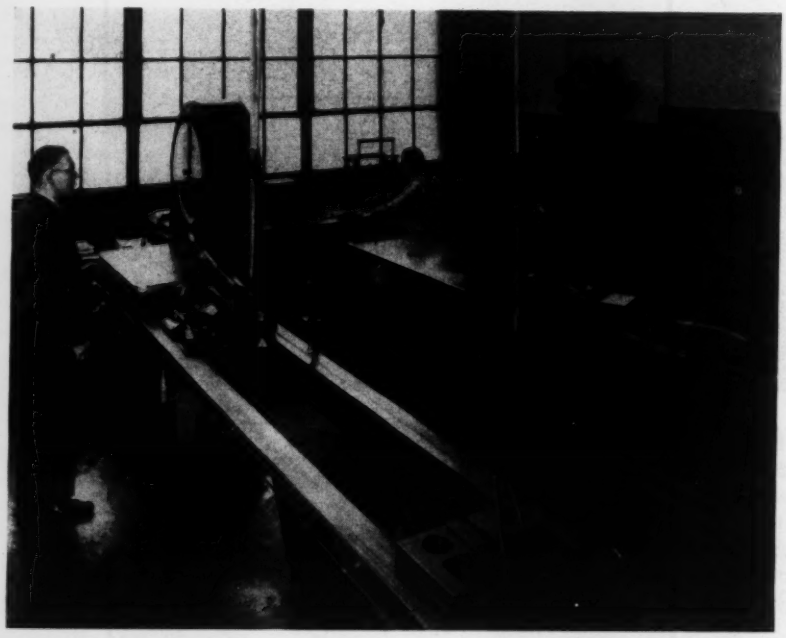
of mild carbon steel having cold rolled threads of the high-fatigue resistant thread form, one-half were annealed before thread rolling while the other half were given a cyanide hardening treatment after cold thread rolling. This latter treatment was an endeavor to increase further the endurance limit of the finished threaded bolt, and was introduced into the experiment as a result of laboratory tests on cyanide hardened threaded fatigue specimens.

While a complete fatigue curve was not obtained, random loaded tests showed that the cyanide hardening effected an increased in the endurance limit on all types of threads. The effect of such a surface treatment with a soft core on raising the endurance limit in rotating beam fatigue tests has been noted by many investigators.

Tests Strictly Controlled—A strictly controlled test of the two above mentioned types of bolts having the high-fatigue resistant thread form, together with new bolts of the standard threaded alloy type previously in use, were placed in express track service on several of the most troublesome sections of curves having a reputation for a high frequency of bolt breakage. After several months of service, results showed that breakage of the annealed high-fatigue resistant thread bolt was about one-third that of the alloy American National coarse thread form bolt. Results on the cyanide hardened high-fatigue resistant form showed a breakage of less than one-eighth that of the alloy American National coarse thread form. In all cases, all breaks which occurred in any type of test bolts were of the fatigue type and not of a tensile nature.

In view of the remarkable success of the trial performance of the high-fatigue resistant threaded guard rail bolt, well over 200,000 have since been placed in this same service within the past three years, with results equal to the initial test performance. They have maintained their very low breakage rate as compared to the former bolts having an American National thread form. With the current high labor rates, the very slightly higher initial cost of the high-fatigue resistant thread form more than compensates for itself, as the present costs of replacing broken bolts, together with the down time loss and delays, is the major item of true cost in the use of fastening devices. This fact is too often overlooked in the selection of such products, as a careful investigation of breakage of threaded items as to their causes, and the application of an item with adequate properties for the actual service, will in most cases result in less down time and a saving in costs.

Use of thread forms having a large radius in the root of the external threaded member is not in itself an innovation. For some years the Aero-Thread screw thread system has made use of a shallow circular-section thread form on the externally threaded member with a spring wire insert for the internal thread. The object is to provide a more substantial internal thread in softer nonferrous materials. Such external threads have proved to be relatively high in resistance to fatigue.



TENSILE TESTS ON LINE WIRE are performed on this 10,000 pound wire testing machine installed in the Hawthorne works of Western Electric Co., Chicago. Samples of all copper line wire and rods from which the wire is made are subjected to tests on the equipment, made by Baldwn Locomotive Works, Philadelphia. This wire must come up to rigid specifications because it is subjected to its own weight when hung between poles, as well as such natural forces as wind and sleet. Machine is capable of applying test loads to wire from 2 to 60 inches long. Loads are applied hydraulically with a 36-inch stroke up to 25 inches per minute. An independent hydraulic weighing system, using an Emery cell as load-sensitive unit and Tate-Emery indicator accurately perform the load measuring function

CALENDAR
OF MEETINGS

† *Denotes first listing in this column.*

Sept. 5-9, American Chemical Society: National Chemical Exposition, Chicago Coliseum. Sponsored by Chicago Sections, ACS 86 E. Randolph St., Chicago 1.

Sept. 11, Society of Automotive Engineers: Tractor meeting, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., New York.

Sept. 11, Society of Automotive Engineers: Aeronautical meeting and aircraft engineering display, in Los Angeles. Society headquarters are at 29 W. 39th St., New York.

Sept. 13-15, Porcelain Enamel Institute: Twelfth Annual Forum, University of Illinois, Urbana, Ill. Institute is located at 1010 Vermont Ave., N. W., Washington 5, D. C.

Sept. 13-16, National Association of Foremen: 27th annual convention, Statler Hotel, Buffalo, N. Y. Association headquarters: 321 W. First St., Dayton 2, O.

Sept. 18-22, Instrument Society of America: Instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y. Society headquarters are at 921 Ridge Ave., Pittsburgh 12.

Sept. 19-21, American Society of Mechanical Engineers: Fall meeting, Hotel Sheraton, Worcester, Mass. Society headquarters at 29 W. 39th St., New York 18.

Sept. 23-26, Packaging Machinery Manufacturers Institute: 18th annual meeting. The Homestead, Hot Springs, Va. 342 Madison Ave., New York 17, is address of institute.

Oct. 2-6, Gas Appliance Manufacturers Association: Biennial exposition, Convention Hall, Atlantic City, N. J. Association headquarters: 60 E. 42nd St., New York 17.

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Synthetic Mama...

BY STALWART

YOU'LL never specify a "synthetic mama", but your rubber part needs can be as specialized . . . to withstand extreme temperatures, chemicals, petroleum products, weathering, abrasion, tear, flex and other factors that cause premature equipment failure. Your rubber part problems can be solved quickly and accurately by Stalwart's highly skilled chemists and engineers.

Today, for example, STALWART is developing special rubber compounds and supplying custom parts in production quantities to the automotive, aviation, home appliance, refrigeration, and other original equipment manufacturing industries. Millions of molded, extruded, punched, and lathe or die-cut parts are fabricated daily from natural and synthetic stocks (including heat-resistant Silicone rubber) to meet individual as well as S.A.E. specifications.

Specify STALWART . . . For Quality Custom Rubber Parts.

SYNTHETIC MAMA'S PERSONALITY

STALWART was specified to develop a rubber teat suitable for attachment to an ordinary milk pail to facilitate controlled calf feeding. The purpose was to free "Mamas" for pasturing while calves were being fed a special diet.

The problems to be overcome in compounding and molding this teat, in spite of its apparent simplicity, were numerous.

1. Lactic acid resistance was a must
2. Compound had to be tasteless
3. Durability was necessary to withstand stretching and pulling
4. Orifice diameter had to be held to close tolerances
5. Rubber had to withstand continual wetting and drying as well as weathering
6. And, the "synthetic mama" had to resist the abrasive chewing of teething calves.

Stalwart's chemists and engineers solved the problem, and more than 20,000 "synthetic mamas" are shipped monthly to a manufacturer in the heart of the dairy land.

STALWART RUBBER COMPANY

9167 Northfield Road • Bedford, Ohio

Drawing Characteristics

(*Concluded from Page 90*)

Because of these relationships it is obvious that it is desirable to have a wide spread between yield and tensile strength to have good drawing characteristics. A low yield strength makes it possible for the flange to be compressed at low stresses and a high tensile strength permits high stresses to be developed in the wall without tensile failure in the sidewalls. A rough approximation of the load necessary to start drawing can be obtained by multiplying the cross-sectional area of the blank at its circumference by the yield strength of the metal. This force is necessary to start plastic deformation of the metal if the additional load due to holddown pressure and friction are not considered.

Estimate Pressure Walls Transmit—Pressure the side walls can transmit from the punch to the flange without breaking can be roughly estimated by multiplying the cross-sectional area of the wall by the tensile strength. These estimates describe the relationship existing at the instant drawing starts.

Just as soon as the flange has been plastically deformed in compression, the yield strength increases due to cold working and the force necessary for the drawing operation to continue gradually increases. This increase in yield strength is supplemented by an increase in the tensile strength in the wall of the shell, also from cold working, so that a balance is maintained. If during drawing the tensile stresses in the side wall necessary to move the metal in the flange become sufficiently high, stretching of the side walls takes place, work hardening them so that breakage will not occur until a stress considerably over the annealed tensile strength has been arrived at.

Yield-Tensile Strength Relationship—To investigate the relationship between yield and tensile strength, for single draw pieces, Allegheny Ludlum recently conducted an experiment on type 302 stainless steel which in the annealed condition had a yield strength of 42,500 psi, tensile strength 90,150 psi, 57 per cent elongation in 2 inches. In this experiment, blanks approximately 0.080-inch thick in several different diameters were drawn to 6-inch diameter cups. One of the blanks, 10 inches in diameter representing a 40 per cent draw to a 6-inch diameter cup required a theoretical load to begin drawing of 52.1 tons as calculated by multiplying the cross-sectional area of the circumference of the blank by the yield strength.

Actually, the maximum ram pressure was approximately 56 tons when drawing at a speed of 24 feet per minute and 52 tons when drawing at 1 fpm. In the former case the holddown pressure was 48 tons and in the latter case 24 tons. Converting the tensile strength of the annealed material, 90,150 psi, into the load necessary to break a 6-inch diameter cylinder having a wall 0.080-inch thick 72.4 tons was obtained.

The actual ram force for a 40 per cent draw under the above conditions was close to the calculated load required to start plastic yielding at the circumference of the blank and the ram force is considerably under the load calculated to be necessary to cause tensile breakage of the side wall of the 6-inch diameter cup.

Data for a 50% Draw—Similar data were obtained for a 50 per cent draw in which a 12-inch diameter blank of type 302, 0.080-inch thick from the same lot of material was drawn to a 6-inch diameter cup. Yield load of the cross-sectional area of the metal at the circumference of the 12-inch diameter blank was calculated as 62.5 tons. In actual drawing at a ram speed of 24 fpm as well as 1 fpm a ram force of 75 tons was required. The calculated force necessary to cause tensile failure of the wall of the 6-inch diameter cup is 72.4 tons as in the previous example. Breakage did not occur during drawing because work hardening of the metal during stretching prevented breakage but conditions were close to the breaking point.

In drawing a 14-inch blank of the same stock, the calculated yield load required to start drawing is 72.9 tons, which is practically the same load as calculated for the tensile strength of the annealed 6-inch cylinder. One would expect the bottom to pull out without much drawing taking place. Actually, the blank drew to a depth of slightly over 1 inch and during this time the ram force built up to 86 tons at which point the bottom pulled out. Thus, even though drawing actually did start, the increase in yield strength of the metal in the flange through cold working was so rapid that the force necessary to continue drawing soon exceeded the tensile strength of the wall of the cup causing breakage.

If Work Hardening Rate Could Be Reduced—If some means could be devised to reduce the work hardening rate of the metal in the flanged area, it might be possible to make this reduction. Such a material would have to behave like type 305 in the flange and like type 301 in the wall of the cup.

Rererence should again be made to the constitution diagram for ternary alloys containing iron, chromium and nickel, Fig. 1. Specifically to the alloy having 75 per cent iron, 17.5 per cent chromium and 7.5 per cent nickel. At room temperature the stable structure would consist of austenite and ferrite. By heating to approximately 100°C, (212°F), or above, the alloy's stable structure would be 100 per cent austenite and therefore would have work hardening characteristics similar to those of type 305. In drawing type 302 stainless steel heated to 300-400°F it would behave in much the same manner as regular type 305.

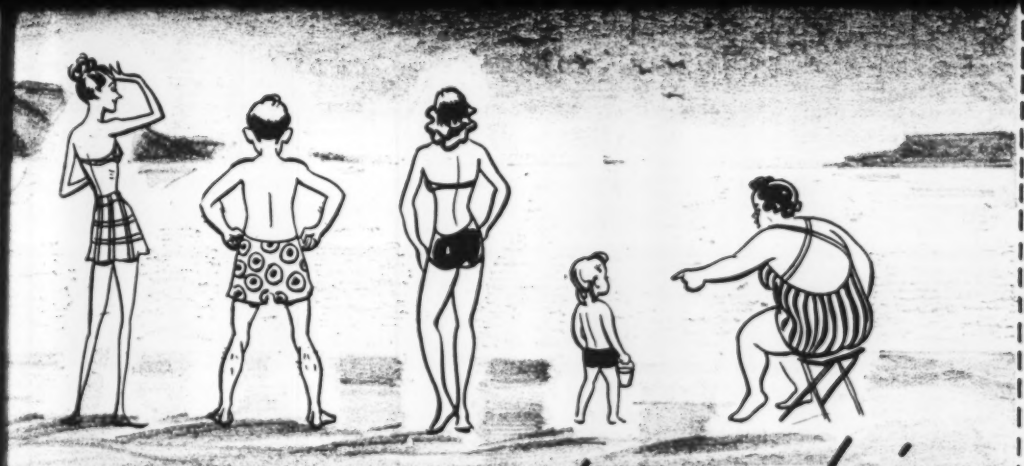
Its limit of drawability would be confined to approximately 45 per cent reduction because of the low strength of the side walls. High strength is required in the wall of the shell as soon as the metal passes over the draw ring, i.e., at that point where the stresses in the metal are changing from compression to tension.

If the metal were cooled below 200°F, as it passes over the draw ring it would revert to the phase characteristics found at room temperature in types 301 or 302. By this technique, one would have ideal drawing conditions since there would be a widespread between yield strength in the flange and tensile strength in the flange and tensile strength in the sidewall. Reductions greater than 50 per cent would be possible.

Experiments on Types 301 and 302—To investigate this theory Allegheny Ludlum conducted experiments on types 301 and 302 attempting to draw a 14-inch diameter blank to 6-inch cup, a reduction of 57.1 per cent from 0.080-inch stock. Tests were conducted on a 300-ton hydraulic press using a ram speed of 1 to 2 fpm, die dimensions being 6.380-inch inside diameter with 0.5-inch radius. Punch dimensions were 6-inch diameter with 0.75-inch radius. The blanks were heated to 300-400°F before placing in the press and the metal passing over the die was cooled with water. Both types 301 and 302 were drawn successfully to full depth by this technique. Samples which failed to draw to full depth all had wall temperatures over 200°F as measured by Tempil sticks.

High strength developed by this severe reduction made it necessary to strain relieve both types at 700°F immediately after drawing to prevent stress cracking.

Tables III and IV summarize the physical properties of various sections



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Possibly you've never considered these products as "bolts". In reality they're threaded fasteners made in various shapes to meet special needs. As a group, we call them "Bent" Bolts.

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LAMSON LOCK NUTS: Economical, vibration-proof. Can be re-used repeatedly.

"1035" SET SCREWS: Cup point type, hardened, heat-treated.

COTTER PINS: Steel, Brass, Aluminum and Stainless Steel.

SPECIAL NUTS: Cone, Barrel, Oblong, Plier, Tri-Slot, Half-round, etc.

PHILLIPS AND CLUTCH HEAD: Machine Screws and Tapping Screws.

MILLED STUDS: Concentric, accurate, in a full range of sizes.

"BENT" BOLTS: Including U Bolts, Eye Bolts, Hook Bolts, etc.

WEATHER-TIGHT BOLTS: Eliminate counter-boring in wood assemblies.

PIPE PLUGS: Forged Steel, heat-treated.

FOR MORE INFORMATION ON LAMSON *Money-Saver* FASTENERS . . . . . CHECK COUPON and CLIP THIS STRIP

The Lamson & Sessions Company
1971 W. 85th St., Cleveland 2, Ohio

of cups drawn from types 302 and 301 respectively. The higher rate of cold work hardenability possessed by type 301 as compared to type 302 is apparent.

In the initial stages of plastic deformation the walls of the 302 cup underwent greater reduction due to its lower rate of work hardening as compared to that of type 301. Greater reduction was necessary to build up sufficient strength in the wall to pull in the blank. Reduction from starting gage of 0.080-inch was to 0.066-inch and to 0.072-inch respectively. Comparative hardness developed at the top lip of the cups (43 Rockwell C for type 301 and 37 Rockwell C for type 302) gives further evidence that relative work hardening and comparative tensile properties from similar locations are much higher in the lower nickel analysis.

Multiple Dies Required—In commercially drawing the chromium-nickel stainless steels, two conventional techniques are used for making articles requiring multiple die work. The more common consists of using an alloy such as type 302 deep drawing, having a moderate rate of cold work hardenability which is drawn 40-45 per cent reduction in one operation. This reduction is sufficient to harden the metal so that little or no redrawing can be accomplished without annealing. After annealing, a large reduction is again taken, and the practice repeated until the part is drawn to size. This practice employs a die setup to prevent metal thickening by using high holddown pressures, minimum die radii and clearance. This causes severe stressing of the metal; high cold worked strength results. The very low work hardening characteristics of compositions like type 305 make such alloys undesirable for drawing by this technique.

The second technique consists of using every device known to reduce the rate of work hardening. Desirable conditions include slow drawing speeds, low holddown pressures, large die radii and generous die and punch clearance and the use of an alloy such as type 305 or 16 per cent chromium—14 per cent nickel composition both of which have a very low rate of cold work hardenability. Reductions are generally made of 35 per cent maximum initial draw followed by redraws of 20, 15 and 10 per cent. This practice is especially advantageous to those shops which do not have annealing or pickling equipment and which must make articles with total reduction from blank to final part between 45 and 70 per cent.

In the fabrication of parts requiring a large amount of stretching accompanied by some drawing, it is necessary to use an alloy having a very high rate of cold work hardenability such as type 301 so that uniform elongation can be obtained. These alloys resist fracturing because of their high strength and ductility and find some limited use in the drawing and forming industry.

Crane Handles Large Die Blocks

Handling of heavy automobile body die blocks, long a problem for automobile manufacturers has been made easy by a 12-wheel locomotive crane operating at the Chevrolet-Flint plant of General Motors Corp. Built by Orton Crane & Shovel Co., Chicago, the crane reportedly is able to move these heavy objects at a much lower cost than before new equipment was used.

Process Speeds Welding

New Lincoln Electric high density hidden arc method requires little or no joint preparation

DEEPLY penetrating arc which in turn allows high welding speed, and little or no joint-edge preparation are advantages offered by a new hidden arc welding process developed by Lincoln Electric Co., Cleveland.

The method employs welding current densities that melt a 5/64-inch electrode at speeds comparable to using 10,000 amperes on a standard 5/16-inch diameter coated hand electrode. Lincoln Electric says it can be used with any standard SAE 600 or 900 welding generator, handling either 3/32 or 5/64-inch diameter electrode wire.

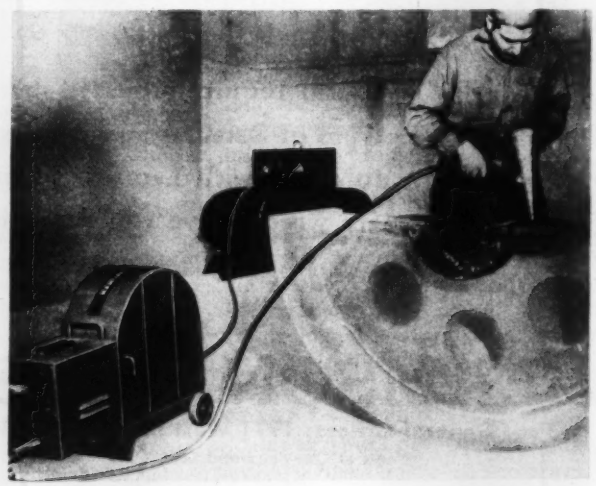
Hook-Up Easy—The unit for using the Hidensity process, as it is called, is connected in a few minutes to the welding generator. It provides all the features of an automatic head and is completely self-contained so that it can be moved to the work independently of the welding generator. It can be operated any practical distance from the generator, and because of its flexibility and portability, it can be used on all types of flat and near flat work.

The "Works" Packaged—The unit consists of a control case, wire reel case, conductor cable and welding gun. The control case contains a wire feed mechanism, consisting of a variable speed direct current motor geared to drive rolls, plus an on-off switch, inch button, arc voltage rheostat and current relay. The wire reel case is connected directly to the control case but may be separated from the controls for special applications. Coils of wire are centered at all times on the reel, which is easily removed for loading.

Feed mechanism automatically feeds wire at a preset arc voltage from the reel through the conductor cable to the welding gun.

Gun Supplies Flux—The gun holds inorganic granular flux which is deposited around the high density arc, completely covering the arc and crater as the gun is moved over the joint being welded. The welding gun is moved either by hand or by attaching it to a mechanized carriage of the cutting torch type.

With the unit connected, a welding generator can be used for either hidden arc welding or regular open arc hand welding; but not at the same time.



Setup employed in Lincoln Electric's new hidden arc welding process. Gun which holds inorganic granular flux deposits material to cover both arc and crater

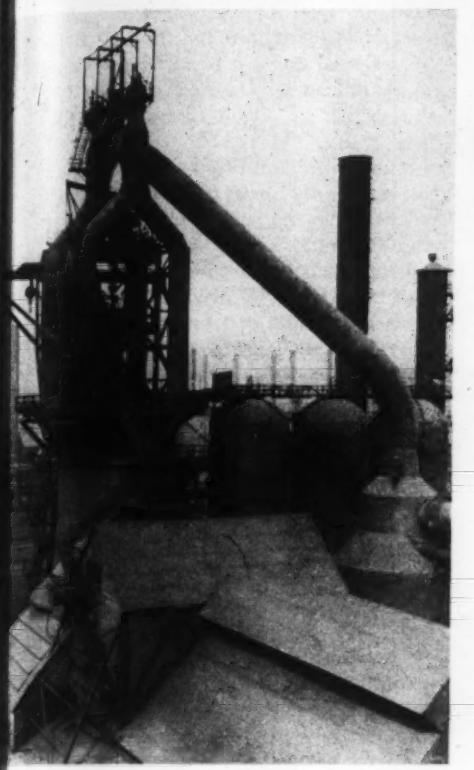


Fig. 1—Modern blast furnace designed for tapping 1330 tons of molten metal in 24 hours

How To Choose Blast Furnace Refractories

Production of pig iron in this country has advanced steadily since introduction of the blast furnace a century ago. Refractory costs approximate 5 to 7 per cent of total cost of new stack. One furnace established a record campaign of nearly 15 years on a single hearth lining

By R. P. HEUER
Vice President
and
C. E. GRIGSBY
Service Research Engineer
General Refractories Co.
Philadelphia

A BLAST furnace, with its three to five stoves and auxiliary equipment, is one of the largest, most complicated, most costly, and most important of manufacturing units. At regular intervals, day and night, year after year, these shaft furnaces consume great amounts of iron ore and other raw materials. Four to six times daily these essential implements pour forth a white-hot torrent of hundreds of tons of crude metallic iron known as "pig iron" (Fig. 2). In basic necessity to modern civilization, this product—the base material for the entire steel industry—is outranked only by agriculture and refractories.

In the past 100 years, in this country alone, the blast furnace has swelled the mere trickle of less than 900,000 tons of pig iron per year, to a rampaging flood which could total virtually 71,500,000 net tons yearly, if all 248 furnaces were operated at full rated capacity. It has smelted a total of 4 billion tons of iron ore in the U. S. since 1870, converting it into half that amount of pig iron. It has changed iron and steel from semiprecious metals, to the most widely used, versatile, and indispensable construction materials of modern industry.

Iron and steel are the lifeblood of industry, and civilization as we know it today is truly dependent upon these metals for its very existence. The independence of any country, its standard of living, and its ability to wage modern warfare are all based on its supply of these vital metals.

Indispensable Tool—In strategic locations throughout the world, hundreds of blast furnaces serve as an index of each country's independence and internal strength. The modern blast furnace, like the one in Fig. 1, is far more than a mere machine for extracting iron from iron ore. It is the working symbol and the bulwark of civilization in this modern age.

In order to understand and fully appreciate the modern blast furnace, and the steel industry which it serves, we must go back to the discovery of iron many thousands of years ago. Man's first knowledge of iron probably came accidentally when he found a new substance—iron—in the ashes of a fire which he had built in a region where the earth was rich in iron ore. When it was found that the iron could be hammered into weapons stronger and tougher than wood or stone, the iron and steel industry was born.

The oldest Egyptian texts, (dated 3500 B. C.) refer to iron, and a fragment of oxidized iron has been dated as about 3200 B. C. One of the first great early advances in wrought iron production came with the discovery that certain rocks—iron ore—produced more iron than others.

First forerunner of the early stone shaft furnaces was simply a pile of iron ore around a fire. Thus, early iron metallurgy consisted of direct reduction of iron ore to sponge iron, without passing through the liquid phase. This dry metallurgy was accomplished by bringing a piece of hot carbon into contact with a piece of iron ore, thereby turning it into a piece of rough, dirty, but fairly pure metal. With this method—largely a

Fig. 2—Molten iron is shown being tapped from a blast furnace into an open-top ladle

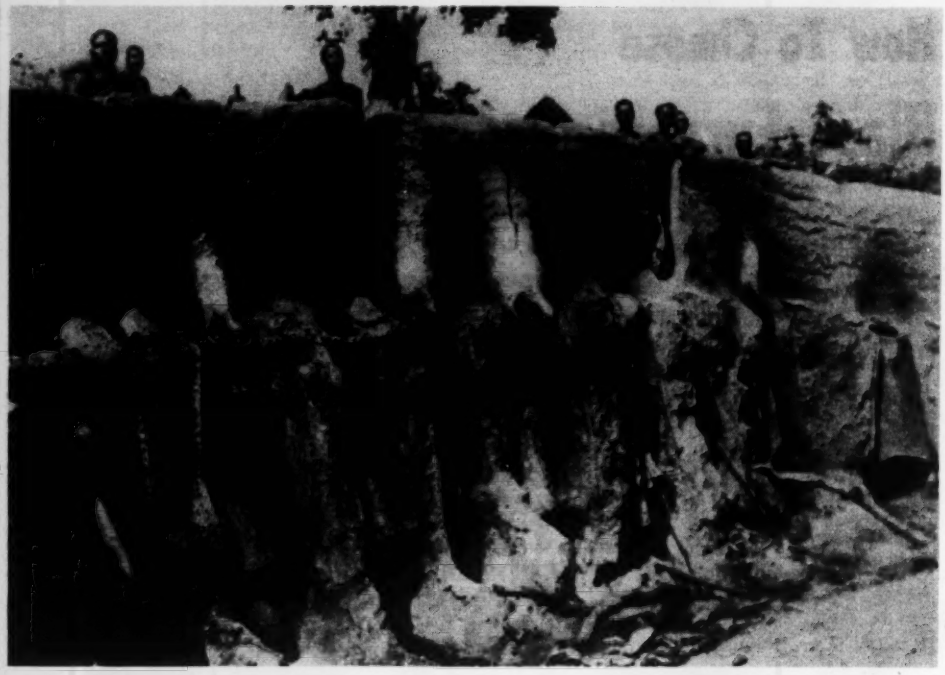


Fig. 3—Row of blast furnaces operated by natives in the Lake Chad area, Africa in 1917

hand operation—production was 5 to 10 pounds daily, and the cost was very high. The discovery that the metal could be produced more quickly when the ore and fuel were broken up and mixed together was another great step forward in the production of iron.

Early Design—The first iron furnace on record was simply a hole in the ground, with an opening at the bottom to provide natural draft. Later designs of early furnaces varied greatly in various parts of the world—many being of the "shaft" type, while others were of the "hearth" type. Regardless of the design, all the early furnaces had one thing in common—low production of iron at a fantastically high cost per ton. In ancient Egypt and Babylon, iron was so scarce and difficult to produce that its value was higher than that of gold.

Even in our generation, some primitive peoples produce iron by methods which civilized nations discarded many centuries ago. The methods used by such backward tribes give some idea of the early difficulties of production that made iron worth more than gold. Fig. 3 shows several tiny, one-man blast furnaces in a successful native iron smelting operation in the Lake Chad area of North Central Africa in 1917. The shaft of these furnaces consists essentially of a vertical gutter,—the back of which is nearly semicircular—quarried about 10 inches deep into the face of a 4-foot shelf of soft rock. The blast main is a slanting hole drilled downward from the top of the shelf to the end of the tuyere, which comprises a 2 to 3-inch horizontal hole drilled back into the rock from the lower part of the shaft.

Lining Procedure — The furnace shaft is completed simply by smearing an 8-inch diameter bundle of straw with a 1-inch layer of mud, pressing the mud-covered bundle into the gutter, and mudding it into place. The straw is then burned out, drying the mud, and the tuyere is connected into the stack. Charcoal and iron ore are charged into the top, and the furnace is ignited. The blower is a crude, but clever, device, operated by a native using both hands and feet. A goat skin, with two sticks attached to permit the operator to raise and lower the skin, is placed over the slanting hole. A small, underground, horizontal hole leads off the blast main and terminates in a small opening which can be covered by the broad bare foot of the furnace man. The foot comprises the intake flap valve of this complicated blowing machine. The native takes his foot off the hole and raises the goat skin with the sticks, drawing in air; he then closes the hole with his foot and pushes down the goat skin with the sticks. The trapped air rushes down through the slanting blast main to the tuyere, and thence to the bottom of the shaft. Charcoal and iron ore are fed into the furnace until the reduced iron plugs up the stack. The lump of iron and slag is removed, heated and hammered to remove some slag, and forged into the shape desired.

The almost unbelievable improvement in iron production which has been made possible by the development of the modern blast furnace can be visualized by comparing such furnaces with the blast furnaces in use today.

Manpower Unlimited—Since a man can exert only about one-eighth horsepower over an extended period, it would require some 80,000 men, operating 80,000 of these midget-size blast furnaces, to produce the same general amount of iron that is made daily in a 1000 net ton blast furnace using a 10,000 horsepower turboblower. The labor force required, and the labor cost at modern rates to produce, in these primitive one-man furnaces, the 196,000 tons of iron which can be produced daily in the blast furnaces in this country, is nothing short of fantastic. Using three 8-hour shifts, some 47,040,000 men would be needed daily to operate the 15,680,000 furnaces required. At $1.25 an hour, the wages would amount to $470,400,000 per day, or $2400 per ton of iron, something like 50 times the total selling price of pig iron today in this country.

The first really revolutionary development in the production of iron came about six centuries ago, with the invention in Belgium in 1340 of the first blast furnace which would produce highly fluid iron. This furnace was the first to utilize the indirect reduction and liquid metallurgy process in which the molten iron flows like water. The blast furnace process was a great improvement over the dry metallurgy which had slowed to a snail's pace the material progress of civilization for so many centuries. Despite the great advance represented by the blast furnace, however, the progress of the iron industry in the first 300 years after the introduction of the blast furnace process was comparatively slow.

The first blast furnaces—small, crude affairs, built of natural siliceous rock and stone— were capable of producing only an extremely small amount of iron per day. Only four years before the building of the first successful iron blast furnace in America, at Saugus, Mass., in 1643, an imported iron pot in this country was more precious than personal adornment. An inventory of the estate of a Maryland planter who died in 1639, listed two dozen garnets as being worth 30 pounds of tobacco (worth about $18 in 1950 currency). An iron pot was worth 32 pounds of tobacco (about $19.20 in 1950 currency) and was among the most valuable of the household items.[1] In early colonial days, some New England ministers were paid in bars of iron.

Iron Output Low — Comparatively

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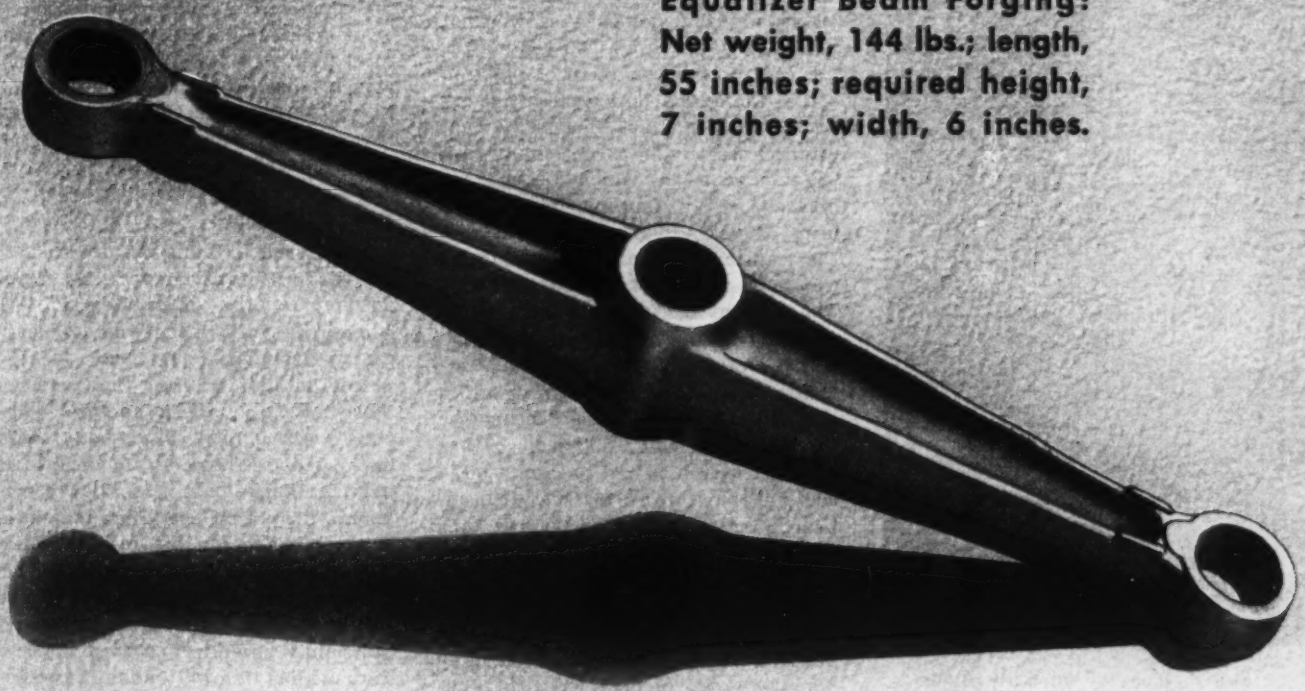

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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

little iron was produced in the first 100 years after the successful introduction of the first blast furnace in this country. The first furnace had a production below 1 ton per day—less than one minute's production for a modern 1500-ton furnace. The early development of the blast furnace proceeded slowly in this country, most furnaces being small, pyramid-shaped, hollow, somewhat conical stone structures 25 to 40 feet high, lined with

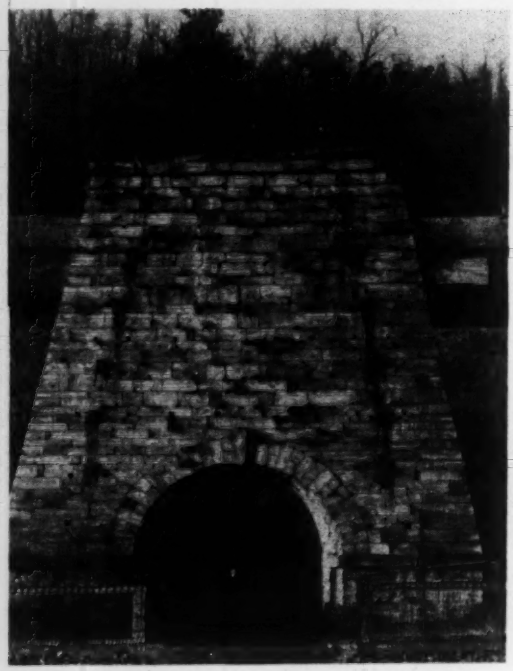

Fig. 4—Lines of an early American old stone furnace which was built of fireclay brick

sandstone. They were usually located alongside a hill to facilitate charging and were supplied with air by a water wheel blowing engine. The wheel operated a large double bellows which forced the air into the lower part of the furnace via a wooden pipe, a leather connecting bag, and a single tuyere. Some time between 100 and 200 years ago, the hillside stone furnaces were replaced with small, simple masonry structures (Fig. 4).

In a little over 100 years after the introduction of the first successful furnace in this country, the blast furnace had developed to an extent which, by 1760, permitted a maximum daily production of about 5 tons. (A modern 1500-ton furnace could produce this same tonnage in about 4 minutes). This liquid pig iron, cast directly into cook pots, cannons, columns, or candlesticks, represented a tremendous advance from the dry metallurgy era of a few pounds daily of sponge iron from which useable articles could ultimately be worked by the laborious process of pounding and forging.

Despite this progress, and that which followed in the next half century, the pig iron produced in this country in 1810 was only about 60,000 net tons—a tonnage which could be produced in less than six weeks by a 1500-ton furnace. Ten years later production dropped to about 22,000 net tons, equal to about two weeks' work for a 1500-ton furnace. Such a furnace could, if necessary, be pushed to match the total production —631,406 net tons—of all U. S. blast furnaces in the year 1850.

Production Expands — It was not until 1864—more than 200 years after the first U. S. production of pig iron —that the annual production first exceeded 1,000,000 net tons. This feat was followed by an exceptionally rapid expansion in which output increased nearly fourteen-fold in the next 36 years. Thus, at the turn of the century the annual production was more than 15,000,000 net tons. The present century has seen progress, in terms of actual tons produced, which dwarfs all previous accomplishments in the production of iron. In the first 10 years of this century the production capacity doubled, so that in 1910 the iron output passed 30,000,000 net tons. In 1916, the then-unheard-of figure of 45,000,000 net tons of iron was produced. This tonnage was still less than three-fourths of the all-time high production of more than 61,000,000 net tons, produced in 1944—a figure that was virtually equalled again in 1948. Even this tonnage is only about 85 per cent of the 71,500,000 net tons which represents the present rated capacity of all the blast furnaces in this country.

A typical modern 1500-ton blast furnace is a refractory-lined, vertical shaft, whose 100-foot girth matches its height. The unladylike proportions and gluttonous appetite of these giant iron makers may have helped change the former practice of giving each furnace a lady's name. The daily diet of such a furnace is more than 10,000 tons of iron ore, air, fuel and flux. These are digested and converted into 1500 tons or more of pig iron, more than half as much slag, and about 8000 tons of gas. At best, some 1500-ton furnaces built within the past few years have without fanfare been producing well over 1900 tons of molten iron daily.

Number of Brick Required — The furnace is lined with 800,000 to 950,000 nine-inch equivalents of high-duty fireclay brick, which cost nearly $100,000. This is less than 1½ per cent of the $7,000,000 which is a typical cost figure for a 1500-ton furnace, stoves, downcomers, hot blast mains, scrubbers and other auxiliary equipment (excluding power and other utility accessories, ore yard, etc.). This 1½ per cent is an almost unbelievably low proportion of the total cost to pay for the very heart of the entire unit—the vital, indispensable part, without which the furnace could not operate. Fireclay brick of various grades for stoves, column bases, dust catcher, downcomers, hot blast mains and stove flues, swell the total refractories cost to $350,000 to $450,000. Thus, the cost of refractories—the most essential part of each section of the equipment—is but a comparatively insignificant 5 to 7 per cent of the total cost of a new furnace unit. Obviously even a marked increase in first cost of refractories would still leave them with the distinction of being by far the lowest-priced part of the entire unit in proportion to their importance.

The furnace lining is usually expected to last seven years or more without repairs. Often they do, and sometimes they last twice as long, but occasionally they must be replaced in half of that time or less. There are countless factors other than brick quality which may cause such wide differences in length of service. Variations in service conditions which seem negligible may have a major effect on the rate at which refractories are destroyed. Even though furnaces of the same design are lined with similar refractories, results may be entirely different. Each furnace has its own unique characteristics—almost its own personality—and no two respond in exactly the same way to a given treatment. Some furnaces are notoriously "bad actors" and are particularly difficult to handle; others are just as noted for being docile, easy-to-manage performers which give little or no trouble. In general, service conditions are a far more likely cause of variable service than variation in quality of any given refractory.

Record Campaign — The world's record for service on blast furnace brick without repairs is 14 years, 11 months, 2 days of almost continuous operation. During this run, in a 28½-foot hearth diameter furnace, the Olive Hill brick below the mantle produced 5,823,951 net tons of iron—2,000,000 tons above that produced on any other bottom. This record is rivaled by the unusually small 65-ton salamander in the bottom of a 16-foot furnace, after a nine-year campaign of well over 2,000,000 tons, on the same brand of brick.

Despite such outstanding performances, rising costs and the demand for steel in the last 15 years, have in-

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MICRO PRECISION SWITCHES for Production Short Cuts

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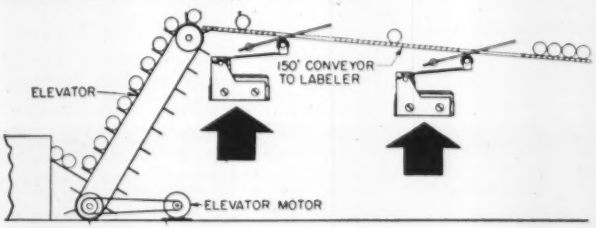
Here are typical applications of MICRO precision switches which have resulted in production short cuts. Plant engineers and factory maintenance men are continually finding new ways of using MICRO precision switches to make present equipment more automatic, eliminate waste, increase accuracy and reduce accidents to personnel and equipment.

Write for "MICRO TIPS." This publication will show you many other ways in which MICRO precision switches have led to production short cuts.

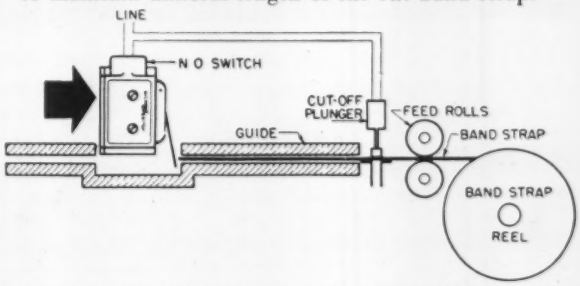
1 Two MICRO Precision Switches Warn When Gravity Conveyor is Jammed

Normally closed circuits of two switches are connected in parallel to motor of elevator of gravity can conveyor, the open sides connected in series to warning signal bell. Both switches will open simultaneously only when gravity conveyor is jammed, not merely when one can rolls by.



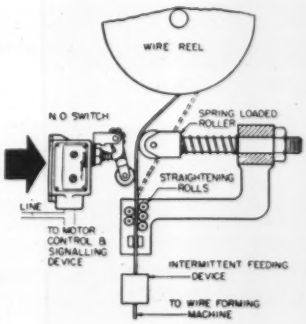
2 MICRO Precision Switch Acts to Cut Strap Lengths Automatically

As coiled band strap is fed through feed rolls, it moves through guide track. A number of square holes are cut on the top of the track and the switch, which actuates the cut-off plunger, is placed in the desired position to maintain uniform length of the cut band strap.



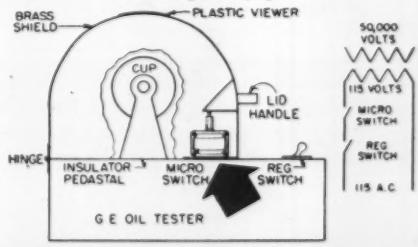
3 MICRO Precision Switch Controls Wire-Forming Machine

When wire is fed to this automatic wire-forming machine it occasionally becomes tangled on the reel and will not strip off. The switch shown here will shut off the motor and signal the operator if wire strips too hard or if wire supply is exhausted.



4 MICRO Precision Switch Insures Safe Operation of 50,000 Volt Measure

To insure safe operation of 50,000-volt transil oil dialectric breakdown check, snap-action switch is installed in series with push buttons in primary circuit. Switch is closed as brass cover with plastic window is closed down over the pedestal insulators supporting the cup of oil and its internal spark gap.



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creased the need for still better refractories. In the search for these, blast furnace operators, in co-operation with refractories manufacturers, have conducted numerous full-scale service trials with several types of improved alumina-silica refractories. Extensive trials have also been made with carbon refractories in several countries.

Most of these refractories, though more costly, have proved more economical. This is because the cost of refractory material is often less than 20 per cent of the overall cost of rebuilding a blast furnace. Thus it is good economics to use refractories of high first cost if their use will reduce the total cost per ton of iron.

(To be continued)

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[1] *Steel Facts*, American Iron and Steel Institute, New York.

Carbonitriding Furnaces

(Concluded from Page 85)

heating cycle, the furnace door opens and the tray is again transferred to the elevator. After the elevator moves to the "up" position, the rack re-enters the furnace, the door closes and the elevator lowers the work into the quench where it remains for approximately 3 minutes. The elevator again moves to the "up" position and the work is withdrawn to the transfer car. A green light shows on the control panel during heating, a white light during quenching and a red light when the entire cycle is completed.

Atmosphere Closely Controlled—Naturally a close control of furnace atmosphere is necessary. Carrier gas, introduced at a rate of 750 cu ft per hour has mixed with it 25 cu ft of ammonia and about 40 cu ft of natural gas, the latter varying according to the demands of dew point control. The carrier gas is produced by passing a mixture of 2.4 parts air and one part natural gas through an endothermic generator which has capacity of 2000 cu ft per hour. The carrier gas acts as a diluent for the natural gas and ammonia introduced into the furnace to accomplish the carbonitriding action.

The generator, located to the right of the two furnaces and supplying both, comprises two concentric tubes filled with a nickel oxide catalyst. Natural gas and air are introduced at the top center, descend through the inner tube to the bottom of the bottle and then reverse to come up on the outside of this tube and into the discharge line which passes through a water cooler before the gas is led to the furnace.

Five Radiant Burners — Heating furnace is fired by five return-bend radiant tube burners, two above the work and entering the front of the furnace, three below the work and entering one side. Each tube dissipates 80,000 Btu for total of 400,000 Btu per hour. Gas consumption is about 800 cu ft per hour. Forced circulation of gas in the chamber is provided by a fan mounted on precision bearings in the top of the furnaces. The main shaft of the fan is water cooled and the entire housing is easily removed for service. The forced circulation is desired to assure uniform surface exposure, convection heating being a factor where parts are densely loaded as in this case. Directed by an alloy hood over the work, hot gases are drawn up through the boxes and forced down the sides.

A high ratio of heating time to total cycle time is achieved. Typical flushing period is only 3 minutes, quenching time 3 minutes, loading and unloading time 3 minutes, against time at heat of 75 minutes. One advantage of the vestibule is that, since it is water cooled, parts can be cooled in controlled atmosphere when desired.

Quench Tank Holds 1300 Gallons—Quench tank on each furnace carries 1300 gallons of oil, maintained in the temeperature range of 125-135° F by means of a heat exchanger connected to steam and water lines. Originally it was proposed to set cooling coils in the oil to control temperature, but Chevrolet engineers decided closer regulation would be possible with the use of heat exchangers, shown in the rear view of the furnaces, Fig. 2. A pump on each quench tank maintains constant circulation of the oil through a series of tubes which give the proper direction to oil as it comes from the pump so that the best possible quenching action can be realized.

As the boxes of gears come from the quench back onto the transfer car, it is moved to an adjacent alkali washer, where the load gets a similar in-and-out treatment, followed by another move to a recirculating furnace, fired by a single burner, for drawing the parts to the desired hardness. Boxes remain in the draw for approximately 50 minutes, at a temperature of 440-450° F.

Bore Finish Honed — Emerging from the draw furnace, the boxes are allowed to cool, the gears being entirely clean and requiring no further treatment except for finish honing of the bore which is done on double spindle honing machines. They remove about 0.002-inch of stock on the diameter to leave the desired 0.002-inch minimum martensite case. Before this final honing, oil grooves are ground, the two faces ground and polished. Equipment was purchased for this purpose but never put into operation.

Finally each piece is air-gaged and to inside diameter limits of 0.6973-0.6978-inch, and other dimensions such as pitch diameter, backlash, tooth form, etc., checked by gages and gear checkers.

Bore Distortion Eliminated—An interesting sidelight on the heat treating process is in connection with the short pinion gear, section of which is shown in Fig. 4. It was found that the bore on the thick end had a tendency to "bell mouth" after heat treatment, no matter how carefully the heating and quenching were controlled. After much study it was determined that the reason was the nonuniform cooling rate resulting from thickness differential from one end to the other.

To relieve this it was decided to machine a ¼-inch groove 5/32-inch deep and radiused at the bottom in the face of the thick end. The groove ring had a diameter of $1\frac{7}{32}$ inches, while the overall diameter of the gear was 1.945 inches. By relieving the section to this extent, all distortion of the bore after heat treatment was eliminated. This is now standard practice. The groove is cut in the first forming operation on the blank, requiring only the use of one more station on the automatic screw machine making the part.

Nickel and Its Alloys

A systematic and readily accessible summary of information about nickel is a new circular, Nickel and Its Alloys, published by National Bureau of Standards, and available from U. S. Government Printing Office, Washington 25, D. C. Designated as NBS Circular 485, it combines information obtained by the bureau in its own investigations with that available in published records of work done elsewhere.

Information includes sources, extraction, recovery, refining processes, metallography, chemical properties, physical properties, mechanical properties at different temperatures, casting, fabrication and miscellaneous processes. Many ferrous and nonferrous alloys are listed, along with their properties.

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New Products and Equipment

Press Brake Has Strong Frame

Bending, forming, blanking and multiple punching operations may be performed on the Metal Worker line of press brakes, offered by Airtherm Mfg. Co., 708 S. Spring Ave., St. Louis 10, Mo. All-steel welded frames maintain stability and accuracy, while single plate friction clutch, integral with flywheel, requires no special tools for adjustment. Ram adjustment equalizes thrust loads through

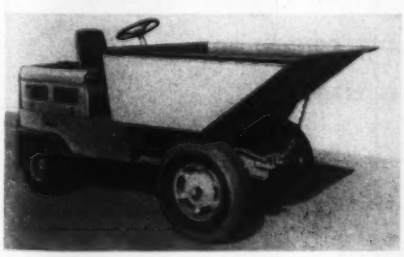
use of alloy steel adjustment screws operating with one right hand and one left hand thread.

Available in four models with 6-inch throat depth, the presses have a mild steel bending capacity of 10 gage over 1⅛-inch 90 degree dies or 16 gage over ½-inch 90 degree dies. All are capable of from 15 to 40 strokes per minute, the stroke being 2 inches. Special features available include wider bed or ram, greater die space, greater stroke and greater throat depth.

Check No. 1 on Reply Card for more Details

Tractor Has Increased Speed

A two-speed transmission permitting 14 mph travel in high gear and 8 mph in low gear, both forward and reverse, is a feature of the redesigned Tructractor line, announced by



Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. A shortened wheelbase, reducing overall length, makes possible a 12-inch decrease in turning radius. Stability is increased through the four-wheel construction and pivoted steering axle.

Distributor, starter and generator are enclosed and spark plugs have rubber covers, making the electrical equipment virtually dust-proof. Frame strength is achieved through use of heavy channel and plate, cross braced, bolted and welded into an integral unit. Lubrication and maintenance points are readily accessible. Tructractors are offered in two models, Tip and Dump, each with bulk-load capacity of up to 40 cu ft; carrying capacity is 4000 pounds.

Check No. 2 on Reply Card for more Details

Bends to 180 Degrees

Tal Bender Inc., Milwaukee 2, Wis., is making an attachment for their 2, 3 and 4-inch pipe benders for making 180 degree bends. The two wings necessary for these bends are each one single unit, without any loose parts. Different frame makes it possible to put the pipe in the bender without resetting of the wings to make the 180 degree bends in a single operation. Attachment is available with any desired standard center bending and may be used with a motor attachment.

Check No. 3 on Reply Card for more Details

Expedites Tube Reducing

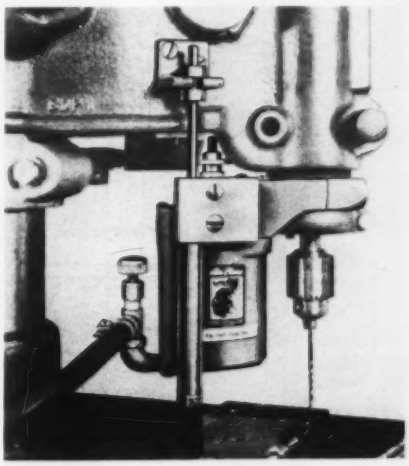
Production of close-tolerance, compression-sized tubing is speeded by a machine developed by Tube Reducing Corp., Wallington, N. J. It has two semicircular dies which rock back and forth over the exterior surface of the tubing to squeeze it until it forms to the shape of dies and an internal mandrel.

Dies are supported by a saddle which moves on rails parallel to axis of tubing. Wheels which support the saddle on the rails are controlled by means of gear racks. Machine uses a new mechanism for feeding and turning the tubing and a more efficient method of spraying coolant onto saddle, dies, tubing and mandrel.

Check No. 4 on Reply Card for more Details

Drill Press Check

Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill., has developed the Hydro-Check which provides uniform resistance for pneumatic drill press feed and other cylinders. Re-



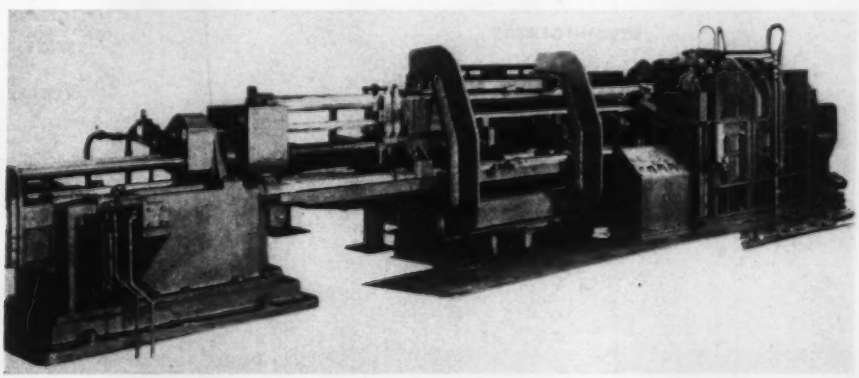
sistance provided is to the power of the air feed and may be increased at a definite point in the stroke.

Unit is easily attached to the drill press feed through two holes in the mounting block and connected to the head of the drill press by a small bracket. Two collars on the ram can be set at any desired point. Check unit can also be used with single acting air cylinders to provide a cushion effect for certain jobs.

Check No. 5 on Reply Card for more Details

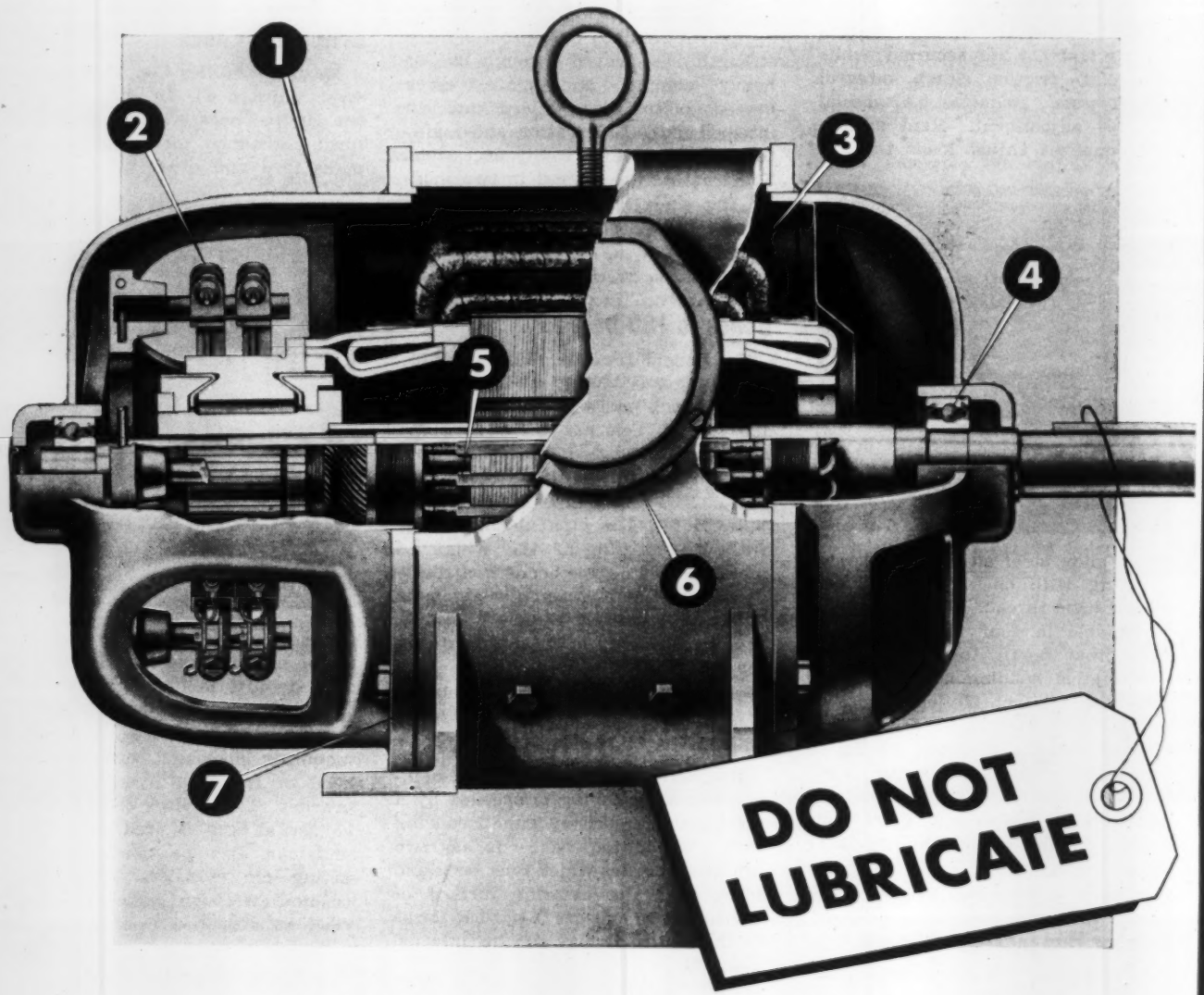
Fourteen-Inch Drill Press

An automatic belt tension device maintains proper tension on the motor belt of the Economy model 14-



YOU CAN BE **SURE**.. IF IT'S

Westinghouse



1. ALL-STEEL BRACKETS
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3. SHELL-WOUND FIELD COILS
4. DOUBLE-SEALED PRE-LUBRICATED BALL BEARINGS
5. HEAVY-DUTY PRESHAPED ARMATURE COILS
6. STEEL-GASKETED CONDUIT BOX
7. ROLLED-STEEL FRAME

If you figure LIFE-COSTS... you'll figure LIFE-LINE

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SK DEPENDABILITY Wrapped in Steel in the NEW Life-Line D-C MOTOR

Thirty-nine years at hard labor—in steel mills . . . in mines . . . in a thousand and one applications—have proved the dependability of the type SK d-c motor. Now, new dependability has been added—new motor stamina . . . new freedom from maintenance . . . new value for d-c motor users.

MAXIMUM STRENGTH AND RIGIDITY—Heavy steel end brackets and rolled-steel frame stand up to the shocking, jarring blows so often encountered in rugged d-c service.

SIMPLIFIED SERVICING—Readily accessible through spacious opening in front bracket, brushholders may be removed individually. Armature coils, wound from Tufvar wire and treated in Thermoset varnish assure long life . . . reduce trouble from shorts and grounds. Double-sealed pre-lubricated bearings (proved in over half a million motors) put an end to greasing problems.

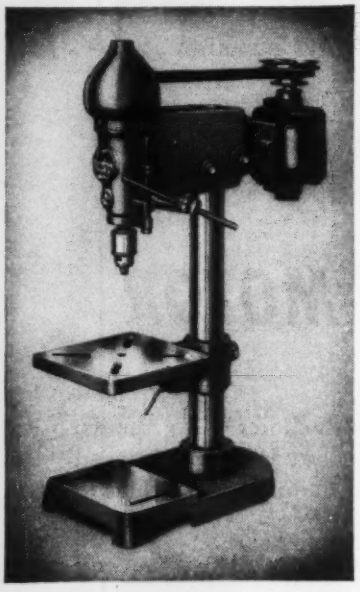
INDIVIDUAL FIELD COIL UNITS—One coil may be replaced without expense of replacing all . . . or discarding pole piece. Just slip the new coil in place . . . save repair costs.

These are a few highlights of the new, all-steel Life-Line type SK d-c motor. Get the complete facts on series, shunt, or compound motors . . . frames 203-365 . . . in 1 to 30 hp ratings. Contact your local Westinghouse representative. Ask for a copy of "D-C Motor" Booklet B-4595, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21549

Westinghouse Life-Line D-C Motors

inch drill press offered by South Bend Lathe Works, South Bend 22, Ind. Spring tension helps to absorb shock if drill should catch in the work. An adjustable feed handle and one-piece head casting, along with head and table column bearings equipped with double plug locking binders which do not change drill press alignment when either assembly is locked or unlocked on the column are other features.

Machine will drill to center of a 14¼-inch circle, using a maximum drill size of ½-inch in steel. Spindle



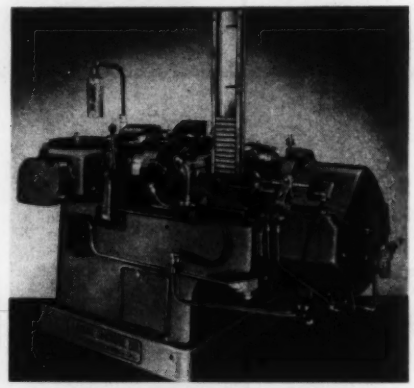
run-out is 0.005-inch and the spindle is square to the table within 0.0075-inch in 5 inches. Table surfaces and base surface of bench model are precision ground and slotted. Vertical mounting ⅓ or ½-hp, 1725 rpm motor gives operator choice of four spindle speeds ranging from 740 to 4070 rpm. Multispeed attachment offers additional speed from 380 to 7770 rpm.

Check No. 6 on Reply Card for more Details

Threads Nipples Automatically

Landis Machine Co., Waynesboro, Pa., is introducing two automatic nipple threading machines, the Landmaco No. 2 for producing commercial standard long nipples up to 6 inches long and the No. 2 close nipple machine for producing commercial standard close, short and special short nipples. Both are available in two capacities: ½ to ¾-inch and 1 to 2 inches. Operator is required to give machine only visual attention and keep magazine charged with blanks. Production rates range from 193 to 625 an hour, depending upon pipe size and regardless of nipple type.

Standard equipment for both types includes internal-trip pipe and nipple die heads with chaser holders, reaming attachments, magazine, cam segments, pipe grips, transfer fingers,

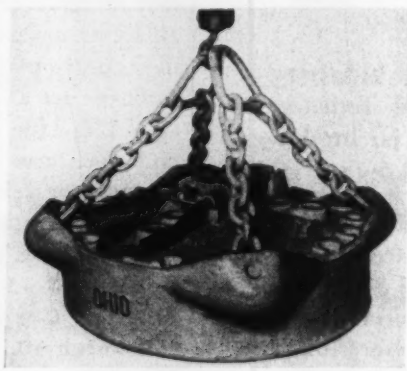


plunger bars and spindle speed gears for one size of nipple. Built-in safety devices prevent serious damage and losses in production due to jams.

Check No. 7 on Reply Card for more Details

Rough Service Magnet

Designed for rough service in steel mills, foundries, scrap yards and fabricating plants is a 55-inch basket type lifting magnet, made by Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland, O. It features an outer ring cast in one piece with four integral "ears" which project beyond the outer ring circumference and



protect the magnet from damage. Suspension is on four alloy steel chains attached to the ears.

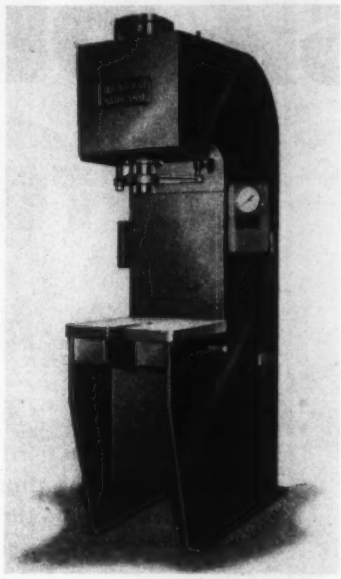
Magnet is sealed and lifting coils are wound from wide copper strip. They are insulated with a heavy-duty asbestos tape which is unaffected by heat or hard knocks.

Check No. 8 on Reply Card for more Details

Hydraulic Forcing Press

Self-contained and equipped with a 5-hp vertical motor and an 11 gallons per minute constant volume pump, the F-101 hydraulic forcing press, made by Hannifin Corp., 1124 S. Kilbourn Ave., Chicago 24, Ill., has an adjustable release valve making possible setting of maximum pressure at any point from 10 per cent of capacity to full 10-ton capacity. Ram is guided to prevent rotation and return stroke is adjustable so cycle time may be reduced on applications where full stroke is not needed.

Press is floor mounted with an 18 x 20-inch table, 36 inches above the floor. Standard models have a 3-inch U slot in the table. Gap is 22 inches, reach is 10 inches and

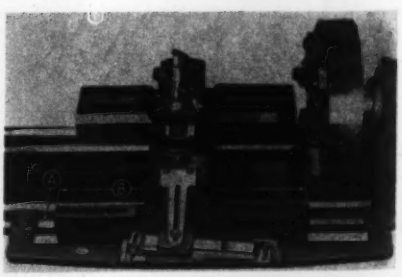


maximum stroke 12 inches. Although single manual lever control is standard, dual manual lever control and sensitive pressure control are available. Also offered is a differential circuit doubling approach speed without limiting feed pressure or return speed.

Check No. 9 on Reply Card for more Details

Taper Attachment for Lathes

Master-Taper Co., 4531 N. Beacon St., Chicago 40, Ill., is manufacturing a taper attachment for mounting on all makes of engine and tool room lathes. It makes possible easier turning, boring and threading opera-



tions. Attachment is suitable for lathes having a swing up to 36 inches to cut a taper of 20 degrees or

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BAKER'S MAGDOLITE

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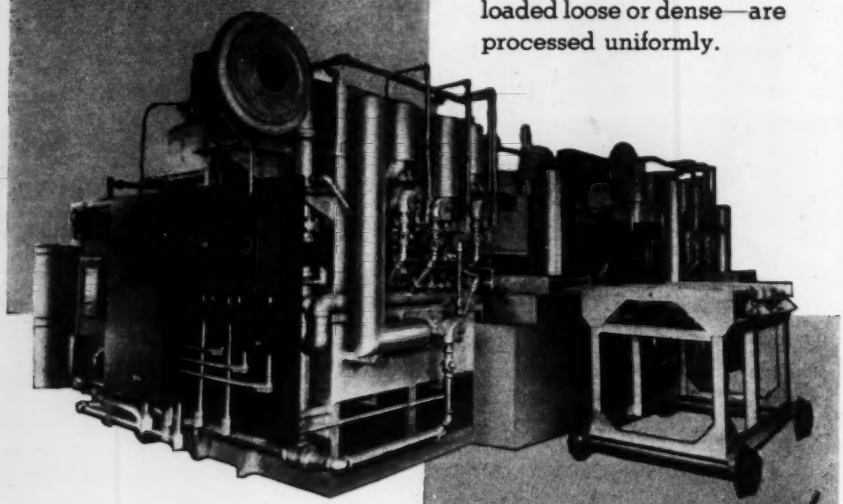
. . . BLAZING THE HEAT-TREAT TRAIL . . .

New Production-line Holcroft batch-type furnace

This compact heat-treat furnace has a vestibule, heating chamber, quenching tank—all above floor level and in one unit.

does more jobs . . .

You'll be able to handle a wide variety of jobs at temperatures ranging from 400° to 1700° F., and get clean, scale-free work. All contamination is removed by a high flow of generator gas in the vestibule. The furnace fan circulates atmosphere so that parts—loaded loose or dense—are processed uniformly.



faster . . .

The furnace can be operated automatically, or manually, by push-button controls. To save time, the temperature is built up between cycles to a point higher than necessary; then the normal operating temperature control is resumed after the cool parts enter the furnace. The quench tank handles the full load in one operation.

at a lower cost!

The furnace requires minimum floor space, no pit for the quenching tank. It can be moved easily—as a unit—to any part of the production line. Trays last longer because they are carried—*not* pushed or pulled while hot.

Want more information? Write us today!

SINCE 1916 Holcroft AND COMPANY

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PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

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CHICAGO 9 — C. H. Martin, A. A. Engelhardt, 4209 South Western Blvd.
CLEVELAND 2 — Wallace F. Schott, 6516 Detroit St.
HOUSTON 1 — R. E. McArdle, 5724 Navigation Blvd.
CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

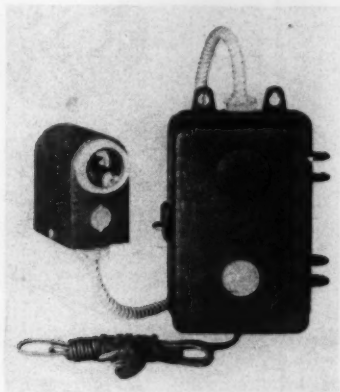
inches per foot and 12 inches longitudinally at one setting.

Sliding fixture has a long bearing surface with gibs to compensate for continuous usage. Swivel bar has V-ways with ends graduated, one in degrees, the other in inches per foot. Smaller size taper attachments are available for bench lathes with a capacity of 16½ degrees or 3½ inches per foot and 7½ inches longitudinally.

Check No. 10 on Reply Card for more Details

Wireless Electric Counting

Up to 600 counts per minute may be performed by the photoelectric counter set P2C, available from Photoswitch Inc., Cambridge 42, Mass. Set consists of photoelectric control with phototube and light source located in small remote housings. Control is powered through a line cord which supplies power for light source,



electric counter and photoelectric scanner.

Operating range may be 10 feet between photoelectric unit and light source. Special light sources are available for longer range. Light source should be carefully aligned so that light beam projects squarely onto the lens of the photoelectric control.

Check No. 11 on Reply Card for more Details

Grinder for Light Work

A vertical spindle grinder, model No. 318-18-inch, built by Charles H. Besly & Co., Beloit, Wis., is intended for free-hand grinding of castings, forgings, stampings, etc., where little stock removal is required. Having an 18-inch diameter abrasive wheel, machine is 31 inches high and 28½ inches wide.

Grinder has a Fairbanks-Morse axial air gap motor developing 5 hp at 1160 rpm. It is of the totally enclosed fan-cooled type and is equipped with ball bearings. All grinding is done in the horizontal plane. Dressing

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Jones

WORM-HELICAL SPEED REDUCERS

Jones Worm-Helical Speed Reducers are high efficiency units built in fifteen standard ratios from 40 to 1 to 250 to 1 for all common motor speeds. They are ideal for vertical shaft drives to agitators, mixers, bending rolls, etc.

The low speed shaft can be extended up or down, for coupling connection or gear drive.

Bulletin No. 75 covers complete details.

W. A. JONES FOUNDRY & MACHINE CO.
4437 W. Roosevelt Rd., Chicago 24, Ill.

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Since 1890
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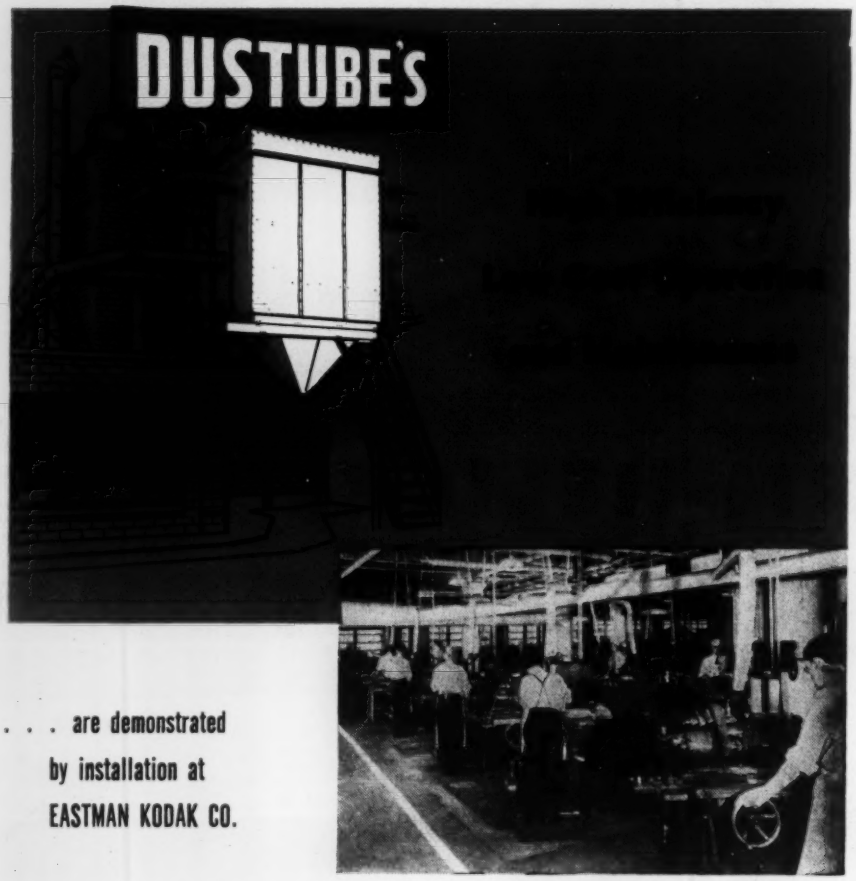
In The Service Of Industry

WORM - SPUR - GEAR SPEED REDUCERS
PULLEYS • GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • FLEXIBLE COUPLINGS



. . . are demonstrated by installation at EASTMAN KODAK CO.

The problem of ventilating 61 grinding wheels, used in processing tools, dies, jigs and fixtures, was solved at Eastman Kodak Co. by installing Dustube Collectors. These high-efficiency collectors trap the finest dust particles with no visible discharge . . rated efficiency is close to 100%. Maintenance is kept to a minimum because the tubes are never under tension; never in contact with abrading or corrosive metal. When infrequent tube replacements are necessary, one man can change them in mere seconds. Inspection is fast and simple from the clean air side. The Dustube reduces power costs because resistance to air flow is much less than in any other cloth type collector of equal capacity.

Thousands of plants, like Eastman, have found that Dustube collectors pay off in increased efficiency, low-cost maintenance and operation. They are supplied in standard sizes from 270 C.F.M. up and in specially engineered systems. Write for literature or a complete analysis of your dust problem, without obligation.

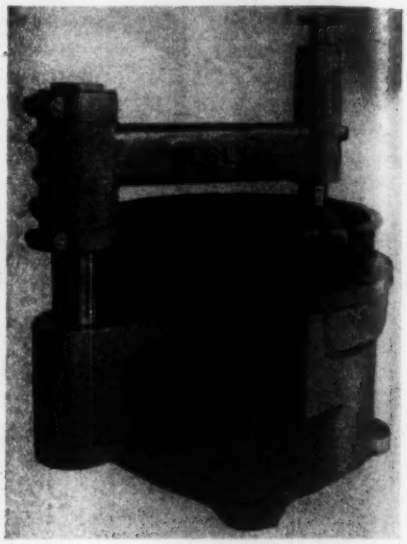
Write for this free 54-page illustrated catalog on Dustube Dust Collectors. It contains valuable engineering data. Ask for Catalog 72-A.

American dustube COLLECTORS

OFFICES IN PRINCIPAL CITIES

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 509 S. Byrkit St., Mishawaka 5, Ind.

of abrasive disk is accomplished by removing a section of the guard rail and swinging the dresser arm across the face. Crossarm, pedestal, motor

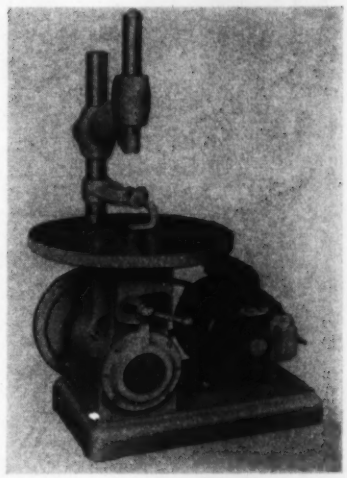


driven coolant pump, tank and piping for wet grinding are optional equipment.

Check No. 12 on Reply Card for more Details

Die Filing Made Easier

Improved model of the die filing machine made by Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill., is easier to operate because of the chucking arrangement for files, saws and stones and an improved lubrication system. Intended for machine filing of intricate die contours, the machine operates at 375 to 500 strokes per minute.



Speeds as low as 250 strokes per minute and as high as 650 outside of the standard operating speed assure cutting efficiency in almost every type of material. These changes can be achieved with special alterations.

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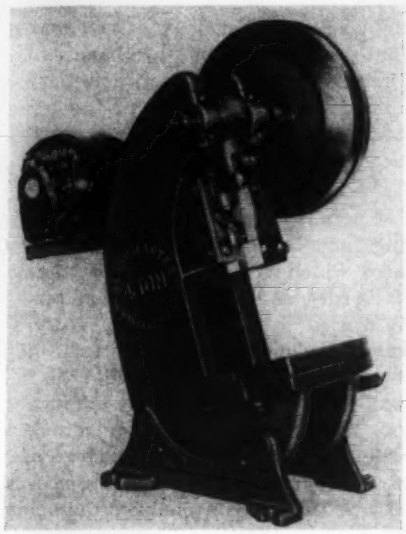
Machine operates on 110 v, 60-cycle alternating current.

Check No. 13 on Reply Card for more Details

Press Has More Die Capacity

Possessing a full 8-inch tooling height with ram up is the 4-ton standard punch press, made by Benchmaster Mfg. Co., 2952 W. Pico Blvd., Los Angeles 6, Calif. Addition-



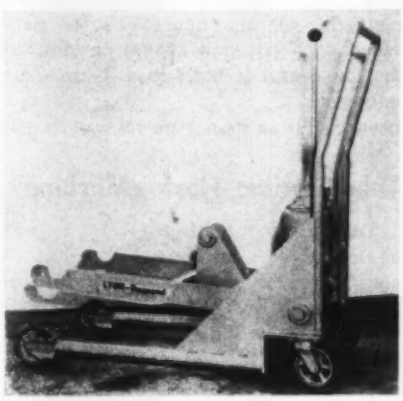
al height is valuable for adapting special tooling and easing set-ups.

Also incorporated are heavy duty clutch dogs made of special shock-resisting steel, clutch linkage which is doubled in thickness for greater strength and rigidity and a clutch wedge with a safety-stop solid block. Flywheel guards are of heavy duty cast aluminum.

Check No. 14 on Reply Card for more Details

Handles Spooled Material

Cable reels and materials on spools may be transported and positioned by a hydraulic truck designed by

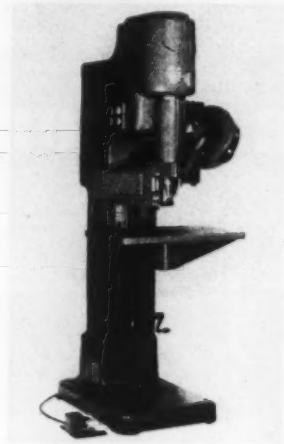


Lyon-Raymond Corp., 9174 Madison St., Greene, N. Y. Opening between base forks and elevating forks is 15 inches and the elevating forks lower to 14 inches and elevate to 28 inches. A single speed hydraulic hand pump and hydraulic cylinder actuate lifting mechanism. Truck is equipped with two 5-inch swivel casters and two 5-inch rigid casters.

Check No. 15 on Reply Card for more Details

Facilitates Nut Driving

Detroit Power Screwdriver Co., Detroit, Mich., has designed a machine for driving nuts semiautomatically or automatically, eliminating manual handling, except for loading the rotary barrel type hopper periodically. The hopper keeps the machine con-



tinually charged with an ample supply of nuts and feeds them in a prepositioned manner to the driving spindle.

Operator handles only the parts to be assembled by placing them in the locating fixture mounted on the work table of the machine. Machine has a capacity of 5/16 to 11/16-inch nuts, across the flats. It will work equally well for special nuts such as jam, castillated, lock, etc.

Check No. 16 on Reply Card for more Details

Conditioned Air for Cranes

Better ventilation, heating and dust and fume protection are provided crane operators by a cab air conditioning unit developed by Dravo Corp., Dravo Bldg., Pittsburgh 22, Pa. Model VHDF is designed for continuous ventilation, heating, dust filtering and fume protection for crane cabs in small confined spaces in industrial plants. Model VHD performs the same functions except for fume removal.

Fan sections of both units can be rotated 90 degrees, enabling continuous discharge of fresh air from tops or either sides. Installation may be in horizontal, vertical or inverted position. Electric strip heaters maintain temperatures between 68 and 72° F during winter months. Either unit operates on alternating or direct current.

Check No. 17 on Reply Card for more Details

No Whip During Threading

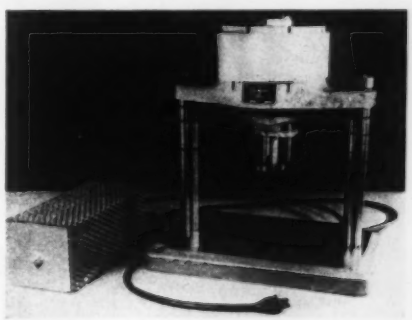
Having a total capacity up to 8 inches, the model E economy pipe and bolt machine, made by Beaver Pipe Tools Inc., Warren, O., will tap and thread pipe, bolts and conduit. Weighing 185 pounds, the power tool is lever fed and smooth operating. An outboard eccentric spool steady-rest prevents whip of long lengths of overhanging revolving pipe from rocking the spindle.

Machine uses the same die heads, dies, interchangeable wheel-and-roller or knife cutoff devices and reamer arm and cone as models A and B made by the company. There are 195 different kinds and sizes of dies available for the three models. New machine has quick-opening, fully adjustable ring-type die heads. A removable perforated tray makes it easy to shake out chips.

Check No. 18 on Reply Card for more Details

Hammer Adds Squeeze to Impact

Capable of delivering an impact up to 6000 pounds is the Electropress electric impact hammer, built by Black & Webster Inc., 30 Pleasant St., Needham, Mass. Following through



with a squeeze of 2000 pounds at the end of the stroke, the tool is capable of performing the following operations: Staking, forming, crimping, marking, bending, clinching, embossing, cutting, riveting, punching.

Operation is through use of forces produced by direct electromagnetic attraction. Operation is from any 115 v ac outlet. Hammer is designed for bench operation and is readily portable. Spindle is easily adjustable above work. Coarse adjustments are obtained by removable ¼, ½, 1 and 2-inch collars on post. Fine adjustment is by thread on spindle giving micro adjustments up to ⅜-inch. Overall height of unit is 16½ inches

and weight is 80 pounds. Maximum stroke length is 1¼ inches and working height below spindle in up position is 4¾ inches.

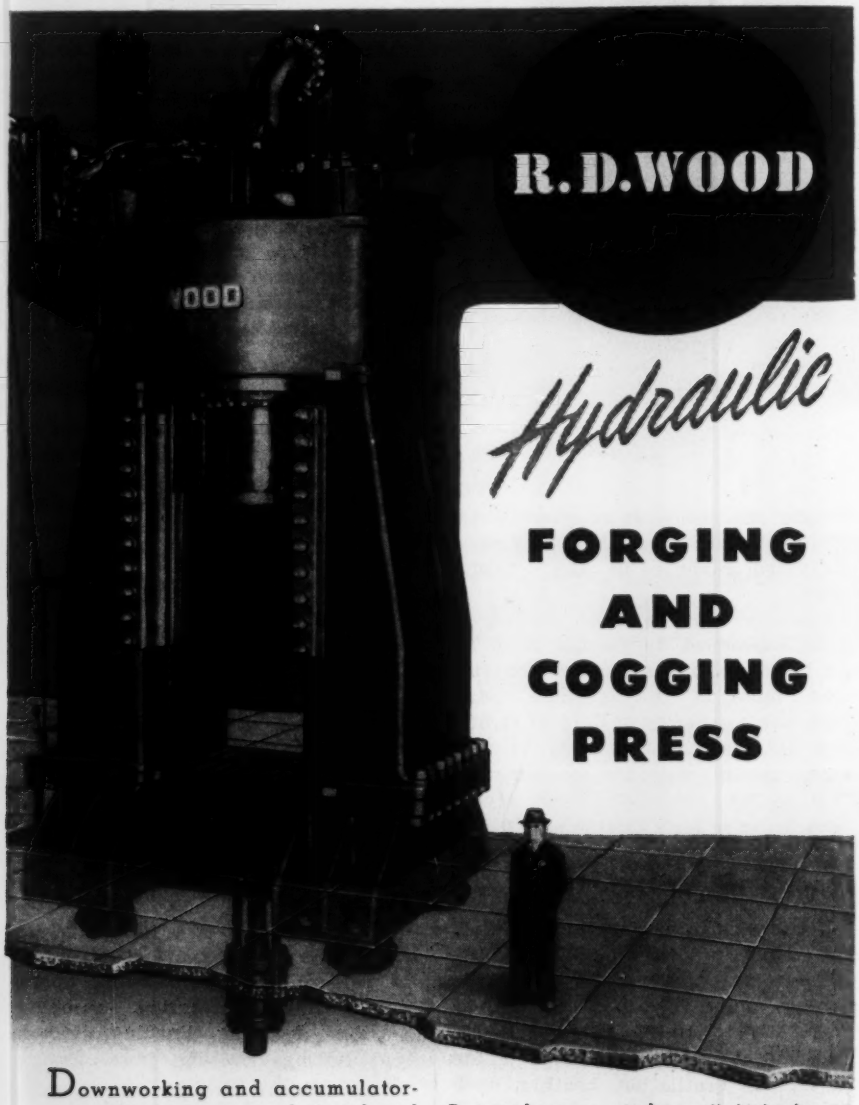
Check No. 19 on Reply Card for more Details

Under Voltage Motor Starters

For power circuits subject to voltage dips or to momentary loss of power, Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O., has developed an under-voltage protection system in which the starter remains locked-in down to a low voltage and which will allow the motor to reaccelerate if voltage recovers within 2 seconds or less. Circuit holds the contactor closed magnetically down to a low voltage of about 25 per cent of normal and upon further drop, contacts break cleanly.

Magnetic starters arranged for standard under-voltage protection allow the contactor-armature to break seal when voltage drops about 20 per cent below normal. With the new type circuit when the voltage reaches about 25 per cent of normal value, causing the armature to open, the coil current decreases rather than rises when the armature-seal is broken. This causes a clean-break of contacts and eliminates the danger of contacts welding under low voltage conditions.

Check No. 20 on Reply Card for more Details



Downworking and accumulator-operated, this press is designed and built for heavy duty die forging, ingot cogging, forming, forcing, upsetting and impact extrusion at high speeds. Patented press control permits instantaneous stopping, or stroke reversal at any point. Capacities are 1500 and 3000 tons. Write for complete information.

HYDRAULIC PRESSES AND VALVES FOR ... INTENSIFIERS

EST. 1803

R.D. Wood Company

Improved Die Filer

Rice Pump & Machine Co., Milwaukee 15, Wis., has redesigned the table of its Milwaukee die filer from a two-way to a four-way, 15 degree tilt. To bring the table back to a horizontal or level position, use of graduated dial plates has been supplemented by the method of slipping dowel pins through matching holes in the pivot bracket. Deep-throated overarm has been redesigned to accomodate practically every die filing operation.

Operator can now do filing, sawing, and lapping with the one overarm which is also suited for needle type files, as the tension can be readily varied to meet operating requirements. Chuck beneath the table has been changed from the rigid to the ball-jointed type to permit alignment of files with warped or crooked shanks with the workpiece. Other features include two operating speeds and Scotch-yoke mechanism to impart a vertical filing stroke without bell-mouthing.

Check No. 21 on Reply Card for more Details

Quick-Action Vise

Embodying a fast slide action, a machinist's vise announced by the Dodge Mfg. Corp., Mishawaka, Ind., opens or closes to any position in one second through a push-pull action which eliminates spinning the handle. Known as the slide-set vise, it is said to speed production, reduce operator fatigue and increase efficiency on bench and assembly operations.

A turn and a half of the handle counter-clockwise slides the jaw to neutral in any position. Once the work is engaged it operates in the conventional manner. Vise is provided with either a swivel or stationary base and is built in a 4-inch size only.

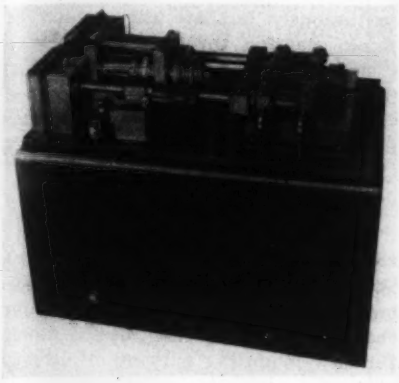
Check No. 22 on Reply Card for more Details

Tube Beading, Flaring Machine

Tubing may be beaded after it is bent by the spinning principle incorporated in the design of a machine made by Gibbons Machine Co., Tipp City, O. Tube is held stationary by blocks in the die while the profile spindle is rotated off center to form the bead. Height of the bead is controlled by the distance the profile spindle is rotated off center.

Limit switch adjustment controls

this distance. The profile spindle has ½-inch throw off center and a one shot oiling system. Machine base is of all welded steel construction with starters, relay switches and control valves mounted inside. Electric mo-



tors, 7½ and 10 hp, power the unit. Time cycle with a potential of 1200 cycles per hour is adjustable by a flow control valve.

Check No. 23 on Reply Card for more Details

3000-Pound Capacity Fork Truck

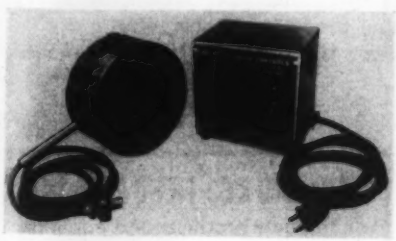
Transitier Truck Co., Portland, Ore., is producing a 3000-pound capacity fork lift truck, designed for that capacity. Called the Hi Duty, it has a 64-inch turning radius and meets the need of plants restricting operation of heavier trucks, yet forced to handle loads in the 3000-pound bracket.

Truck has increased hydraulic capacity with single lever controls and improved steering. Other features include Hydroflex clutch, pneumatic tires and good maneuverability.

Check No. 24 on Reply Card for more Details

Electric Magnetic Chuck

Magnetic force with a total pull of over 2 tons holds the work to the surface of model C electric magnetic chuck, made by Continental Electric Co., 1234 S. Prairie Ave., Hawthorne, Calif. Unit is offered with a control box that plugs in on 115 v, 60 cycles. Chuck itself plugs into the control box



which has two switches, one for energizing the chuck surface and the other for demagnetizing the chuck.

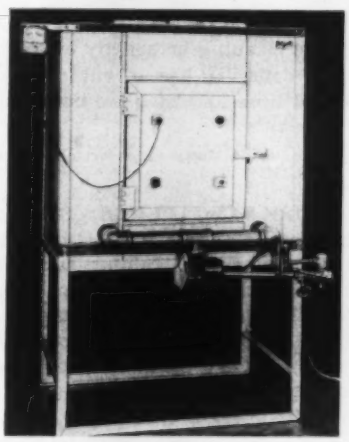
Chuck may be used as a magnetic chuck, demagnetizer or a magnetic inspection tool to inspect small parts for cracks and fractures not ordinarily visible. Windings are sealed to protect chuck from moisture present in lubricants used when grinding operations are performed. Bore in hub is machined for a 2¾-inch diameter spindle, 5 threads per inch, comes fitted with one adaptor that may be machined to fit smaller spindles if necessary.

Check No. 25 on Reply Card for more Details

Metal Treating Furnaces

Available in capacities ranging from 1.8 to 20 cu ft and a temperature range from 0 to 2500° F are metal heat treating furnaces made by A. D. Alpine Inc., 11837 Teale St., Culver City, Calif. They are equipped with porcelain protected thermocouples and direct-reading pyrometers with calibrated energy input and atmosphere proportioning.

Forced draft type of burner which operates on natural, manufactured or



liquid petroleum gases effect operation economy. A solenoid valve cuts off the fuel in the event of electrical failure which stops the blower. Furnace insulation keeps outside temperature at approximately 150° F at the height of operation.

Check No. 26 on Reply Card for more Details

Sets Nut at Angle

High torques for medium sized nuts are provided by two-angle-type nut setters developed by Keller Tool Co., Grand Haven, Mich. Models 16C-43 and 16C-46 are designed with 12:1 gearing in the gear case which, coupled with 1:1 and 2:1 gearing in the angle attachments, provides torques of 30 and 60 foot-pounds. Compact, small angle attachments adapt the tools to fast work in close quarters.

Standard double-end or built-in socket-angle attachments, used interchangeably with single-end attachments, give versatility to the tools. Complete interchangeability between attachments and gear case assemblies gives users a compact "tool kit" of angle-type nut setters for work in restricted areas.

Check No. 27 on Reply Card for more Details

Selective Conveyor System

Union Steel Products Co., Albion, Mich., is producing the Wendway selective delivery conveyor system which is made up of standard units that are assembled in any combination, making it flexible and easy to install. Each unit is composed of an endless belt of steel rods, linked on the ends, producing a light, strong and closely spaced conveyor.

Units turn corners, can be slanted up or down, arranged as a single lane or in multiple tiers and will run fast or slow. They provide smooth and silent operation with minimum maintenance. Application may be to light manufacturing and assembly operations, packaging and shipping.

Check No. 28 on Reply Card for more Details

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HINGED STEEL CONVEYOR: May-Fran Engineering Inc., Cleveland 12, O., announces a new hinged steel conveyor belting which has been developed to facilitate mechanized handling of hot or highly abrasive metal parts, scrap forgings, etc. Its precision formed links are made from heavy gage steel plate and are fastened by high carbon steel rods so that side chains become an integral part of the conveyor belting.

Check No. 29 on Reply Card for more Details

HANDLES 1000 POUNDS: Coffing Hoist Co., Danville, Ill., announces a 1000-pound capacity Mighty Midget puller, a hand operated hoist or puller. Handle may be used as a straight lever when loads are especially heavy or where lack of headroom allows only partial strokes; or lower section may be located at right angles to upper section, forming a crank for high speed lifting or pulling.

Check No. 30 on Reply Card for more Details

SWIVEL FITTINGS: Ramsco ball bearing swivel fittings for free and easy rotation of 360 degrees under pressure are available from Rasmussen Mfg. Co., Hollydale, Calif., in three types: High pressure up to 15,000 psi at 225° F, low pressure up to 1000 psi at 225° F and high tem-

perature-corrosive service, up to 1000 psi at 750° F.

Check No. 31 on Reply Card for more Details

WASHERLESS SCREW: Spin-Lock, a new washerless screw in hex, pan, truss or flat heads is available from Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. It has patented ratchet-like teeth on the underside of the head which eliminates the washer.

Check No. 32 on Reply Card for more Details

CUTTING TOOLS: Bokum Tool Co., Detroit, Mich., introduces a new type of lathe and turret lathe turning tools, combining a blade and holder. The combination utilizes a blade, in choice of high speed steel or carbide tipped, inserted in a holder of heat treated chrome nickel steel. Six models comprise the line, each with a specific blade designed for its specific purpose.

Check No. 33 on Reply Card for more Details

DEMAGNETIZING COIL: An improved design of demagnetizing coil, announced by Special Products Division, General Electric Co., Schenectady 5, N. Y., is effective in demagnetizing materials and stabilizing magnetic flux. It can be used to eliminate undesirable magnetic flux from tools, drills, punches, small arms and any machine part that may have become magnetized. Instrument is capable of reducing flux density and stabilizing it at the desired value.

Check No. 34 on Reply Card for more Details

LOCK NUTS: Improved design of the Gripco lock nut, made by Grip Nut Co., Chicago, Ill., has six double-triangle thread-deflection areas. The projection weld nut has also been improved to make a more positive weld. These nuts are available with either common threads or with double-triangle Gripco lock.

Check No. 35 on Reply Card for more Details

MAGNETIC LATCH: Leco-Latch, offered by Laboratory Equipment Corp., St. Joseph, Mich., is a magnetic latch for use on cupboard doors. It has no moving parts and no springs.

Check No. 36 on Reply Card for more Details

ROOF VENTILATOR: Designed for exhausting air from foundries, machine shops and other buildings where harmful exhaust fumes must be disbursed into the air as high as possible above the roof, new vertical discharge roof ventilators are announced by DeBothezat Fans Division, American Machine & Metals Inc., East Moline, Ill. They are available with fan wheels 36, 42 and 48 inches in diameter and capacities up to 40,900 cu ft of air per minute.

Check no 37 on Reply Card for more Details

CUTTING TOOLS: Dovetail cutters, made by Reltool Corp., Milwaukee 5, Wis., are designed for use in standard types of end mill holders. Right hand cut is standard with either 45 or 60 degree angle.

Check No. 38 on Reply Card for more Details

TORQUE CONVERTER: Model 142X Zero-Max variable speed torque converter for use with motors from 1/15 hp to ¼-hp is announced by Revco Inc., Minneapolis 2, Minn. It has a torque rating of 20 inch-pounds, provides full torque conversion at all speeds and infinitely variable speed from 0 to ¼ the input motor speed.

Check No. 39 on Reply Card for more Details

STEAM CLEANING COMPOUND: Blast, a heavy duty steam cleaning compound, is introduced by Du Bois Co., Cincinnati 3, O. It is said to have excellent detergency and gives extra speed and energy needed for fast cleaning of heavily encrusted greasy soils. It has a water softening and lime and magnesium sequestering ability.

Check No. 40 on Reply Card for more Details

SELF-LOCKING PLUGS: Self-locking electrical plugs for sectionalizing welding machine trailing cable are available from Joy Mfg. Co., Pittsburgh 22, Pa. Pinsocket arrangement prevents accidental disengagement yet allows easy connects and disconnects. They are available for all standard welding cable sizes as complete assemblies or molded to 36-inch leads for attaching to your own cable.

Check No. 41 on Reply Card for more Details

PACKING ADAPTORS: For stuffing box use against air or oil pressures, Gilson Co. Inc., Chicago, Ill., offers bronze packing adaptors for V-type packing. Known as RODgers adaptors, they are offered with either a 90 or 100 degree included angle. Stack heights or contact heights for both the male and female adaptors are the same as the A-N standard stack heights for use with V-packings.

Check No. 42 on Reply Card for more Details

SUPPORTS AIR HOIST HOSE: To support the air hose for hoists installed on an I-beam, Keller Tool Co., Grand Haven, Mich., has developed a hose trolley. It is designed to keep the air hose suspended so as to clear machinery and remain out of the path of workers. When hoist is moved along the beam, trolleys are pulled along by the hose until extended full length.

Check No. 43 on Reply Card for more Details

INDICATE SMOKE DENSITY: To continuously indicate the density of smoke passing through the stack of a power plant and signalling when this smoke exceeds a predetermined value, a new series of smoke indicators is offered by Combustion Control Corp., Cambridge 42, Mass.

Check No. 44 on Reply Card for more Details

CONTROL VALVES: A. Schrader's Son Division, Brooklyn 17, N. Y., introduces a 4-way air control valve that is ½-inch in size and designed for base mounting with manifold pipe ports for concealment of piping. It is designed for unrestricted air passage of 250 cfm at 100 pounds line pressure.

Check No. 45 on Reply Card for more Details

SOLDERING FLUX: Divco No. 229 liquid soldering flux, made by Division Lead Co., Chicago 22, Ill., eliminates practically all cleaning and burnishing of metal parts necessary before a soldering job can be done. It is squirted on the parts from the container.

Check No. 46 on Reply Card for more Details

BUFFING COMPOSITION: No. 4-S-10 is a new water dispersible buffing and coloring composition developed by Hanson-Van Winkle-Munning Co., Matawan, N. J. It is easy to clean in aqueous solutions using a mild alkaline cleaner with or without current. It is especially useful in work with deep filigrees which tend to trap composition into hard masses.

Check No. 47 on Reply Card for more Details

PROTECTS AGAINST RUST: Gun Guard, a new type rust preventive oil and lubricant, is introduced by Mitchell-Bradford Chemical Co., Stratford, Conn. It is packaged in an aerosol container for spray application to metal parts, fabrications in storage and production, tools, etc.

Check No. 48 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

UNIVERSITY OF MICHIGAN LIBRARIES

Market Summary

STEEL procurement problems are increasing in intensity. With producers virtually out of the market on all products over remainder of the year, consumers are waging a losing battle in their struggle to get additional tonnage. More and more the market assumes a pattern reminiscent of wartime. Voluntary allocations by the mills are definitely restricting shipments to established customer quotas resulting in a futile consumer scramble for protective tonnage in every direction. Military requirements, carrying precedence over civilian orders, are necessitating some adjustments in allotments and rolling schedules to the disadvantage of the regular trade. At the same time the steelmakers are seeking to keep prices and production costs in check, latest efforts being directed toward stabilizing scrap prices.

SUPPLY— All of the mills are sold out for the remainder of the year on the major products. And few of them have open capacity for any more specialty tonnage, such as alloy bars and stainless sheets. In fact, it appears that the only exceptions as regards tight supply are forgings, tool steels and certain wire products, such as wire rope. Extended fabricating shop deliveries, due to shrinkage of structural shape supply and heavy bookings, are restricting structural steel orders. Most bar mills are sold out for the rest of the year. The same is true of platemakers who can accept only highly rated tonnage for insertion in mill rolling schedules this year, and then only at expense of present customer allotments. Sheet mills will blank out from one to two months production in fourth quarter in an effort to become current on commitments. Cutbacks in galvanized sheet allotments have been necessitated to care for government grain bin needs. Pig iron supplies are tightening with demand mounting.

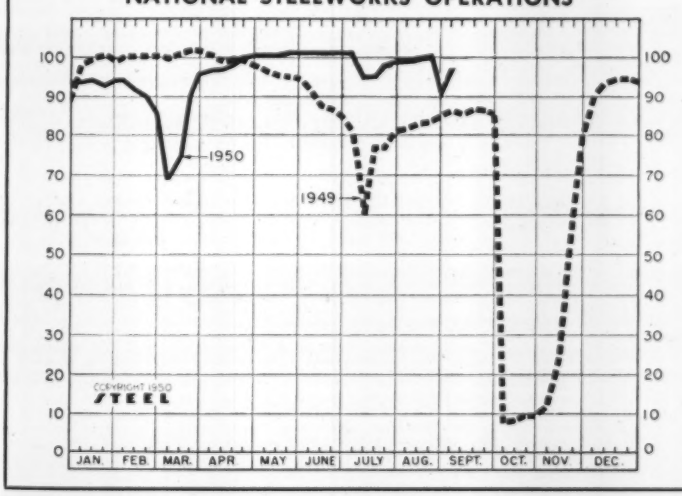
PRICES— The tone of the market is very strong but no major changes in prices are noted. Isolated advances continue to be made by the smaller producers but the larger interests are holding firmly to long established schedules. Last week several additional producers of stainless clad plates and sheets advanced prices. Otherwise, no revisions of consequence were reported. Scrap, however, eased noticeably, especially at Pittsburgh, on efforts of steelmakers to stabilize the market on a lower level than has prevailed recently. Scrap prices have been rising rapidly since outbreak of the Korean war.

COMPOSITES— STEEL's composite on steelmaking grades of scrap declined last week to $40.92 from $42.50 the preceding week. A year ago this price index stood at $23.58. Easiness is most noticeable in Pittsburgh and adjacent areas, but distant markets also appeared to be affected by the stiffer attitude of the Pittsburgh mills in covering requirements. Finished steel weighted index holds at 156.99 as does the arithmetical composite on finished steel products at $94.50. Pig iron composites are unchanged with No. 2 foundry, $46.85, basic, $45.97 and malleable, $47.49.

PRODUCTION— The steel mills boosted operations 7.5 points last week to 97.5 per cent of capacity, equivalent to production of more than 1,880,000 tons. Seizure of the railroads by the government marked end of the token railroad strikes which had forced suspension of steelmaking operations at some points the preceding week.

DISTRICT RATES— District steelmaking operations last week were: Cleveland, 92 per cent, up 26.5 points; Chicago, 91.5, up 16.5 points; Pittsburgh, 102, up ½ point; Detroit, 110, up 4 points; Wheeling, 97.5, up ½ point; New England, 65, down 22 points; Far West, 102, off 1.5 points; unchanged were Youngstown at 106, Buffalo, 104, Cincinnati, 103, Birmingham, 100, eastern Pennsylvania, 98.5, and St. Louis, 89 per cent.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Sept. 2	Change	Same Week 1949	Same Week 1948
Pittsburgh	102	+ 0.5*	80.5	93.5
Chicago	91.5	+16.5*	91	94
Eastern Pa.	98.5	0	80	92
Youngstown	106	0	94	103
Wheeling	97.5	+ 0.5	96	92.5
Cleveland	92	+26*	101.5	91.5
Buffalo	104	0	101.5	101.5
Birmingham	100	0	100	100
New England	65	—22	77	89
Cincinnati	103	0	97	99
St. Louis	89	0	87	85
Detroit	110	+ 4	103	99
Western	102	— 1.5	85	..
Estimated national rate	97.5	+ 7.5	86	95

Based on weekly steelmaking capacity of 1,906,267 net tons for first half and 1,926,803 second half, 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948. * Change from revised rate.

Composite Market Averages

	Aug. 31 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.99	156.99	156.69	152.52	101.85
Index in cents per lb. ..	4.253	4.253	4.245	4.132	2.759
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.50	$94.50	$94.36	$91.55	$58.27
No. 2 Fdry. Pig Iron, GT	46.85	46.85	46.85	46.10	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT..	47.49	47.49	47.49	47.27	25.29
Steelmaking Scrap, GT..	40.92	42.50	37.33	23.58	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Aug. 31 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35	2.25
Bars H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, H.R., del. Philadelphia	3.93	3.93	3.93	3.83	2.57
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95–4.00	2.75
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Shapes, del. Philadelphia..	3.46	3.46	3.42	3.50	2.215
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa. ..	3.90	3.90	3.60	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.40	2.25
Plates, Claymont, Del. ...	3.90	3.90	3.60	3.50	2.25
Plates, del. Philadelphia ..	3.84	3.84	3.69	3.59	2.30
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh...	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh...	3.50	3.50	3.25–50	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15–50	4.15–50	4.15–50	4.00–55	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–95	4.35–95	4.35–95	4.20–25	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh ...	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT)	58.00	58.00	58.00	60.00	36.00
Wire rods, ⅜-⅝", Pitts...	3.85	3.85	3.85	3.40	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47–$50	$47–$50	$47–$50	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	50.39	50.39	49.44	49.44	26.34
No. 2 Fdry, Pitts.	49.50	49.50	49.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	50.89	50.89	49.94	49.94	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

*Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$44.00	$46.00	$41.00	$24.75	$20.00
No. 1 Heavy Melt. E. Pa. .	38.50	41.50	33.00	20.00	18.75
No. 1 Heavy Melt. Chicago	40.25	40.00	38.00	24.50	18.75
No. 1 Heavy Melt. Valley..	43.75	46.25	42.25	25.25	20.00
No. 1 Heavy Melt. Cleve..	41.75	43.25	40.25	21.75	19.50
No. 1 Heavy Melt. Buffalo.	39.75	39.75	36.75	26.25	19.25
Rails, Rerolling, Chicago..	59.50	56.50	50.50	37.50	22.25
No. 1 Cast, Chicago	49.50	49.50	44.50	40.50	20.00

Coke, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$13.25	$7.50
Beehive, Fdry., Connlsvl...	15.50	15.50	15.50	15.75	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.00	13.35

NONFERROUS METALS

Copper, del. Conn.	22.50-24.50	22.50-24.50	22.50	17.625	12.00
Zinc, E. St. Louis	15.00	15.00	15.00	10.00	8.25
Lead, St. Louis	13.80	13.80	11.80	14.925	6.35
Tin, New York	98.50	101.00	97.75	103.00	52.00
Aluminum, del.	17.50	17.50	17.50	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	48.00	48.00	48.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	48.00	$48.50	$49.00	$49.50
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Newark,del	50.63	51.13	51.63	52.13
Philadelphia, del.	50.39	50.89	51.39	51.89
Birmingham District				
AlabamaCity,Ala. R2	41.88	42.38	....	....
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward,Ala. W15	41.88	42.38	....	....
Cincinnati,del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y., W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester,N.Y., del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W-14, Y1	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron,del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash., del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del. ...	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del. (incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
LoneStar,Tex. L6	41.50	*42.00	42.00	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	49.50	49.50	50.00
Pitts,N.&S. sides, Ambridge, Aliquippa,del.	....	50.69	50.69	51.19
McKeesRocks,del.	....	50.45	50.45	50.95
Lawrenceville,Homestead, McKeesport, Monaca,del.	....	50.94	50.94	51.44
Verona,del.	....	51.40	51.40	51.90
Brackenridge,del.	....	51.63	51.63	52.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	....	....	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Swedeland,Pa. A3	50.00	50.50	51.00	51.50
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N. Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson,O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$78.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2.	82.00
Wenatchee, Wash., OH & Fdry., frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Aug. 31, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 .....$50.00
Fontana,Calif. K1 ....76.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)
Detroit R7 .....$51.00
Fontana,Calif K1 .....77.00
Houston,Tex. S5 .....59.00
Midland, Pa. C18 ....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ..51.00

BILLETS, BLOOMS & Slabs
Carbon, Rerolling (NT)
Bessemer,Pa. C3 ....$53.00
Clairton,Pa. C3 .....53.00
Conshohocken,Pa. A3..62.00
Ensley,Ala. T2 .....53.00
Fairfield,Ala. T2 ....53.00
Fontana,Cal. K1 .....72.00
Gary,Ind. C3 .....53.00
Johnstown,Pa. B2 ....53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 .....53.00
So.Chicago,Ill. C3 ...53.00
So.Duquesne,Pa. C3 ...53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ....$63.00
Buffalo R2 .....63.00
Canton,O. R2 .....63.00
Clairton,Pa. C3 .....63.00
Cleveland R2 .....63.00
Conshohocken,Pa. A3 ..68.00
Detroit R7 .....66.00
Ensley,Ala. T2 .....63.00
Fairfield,Ala. T2 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Geneva,Utah G1 .....63.00
Houston,Tex. S5 .....71.00
Ind.Harbor,Ind. I-2 ....63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2...63.00
LosAngeles B3 .....82.00
Munhall,Pa. C3 .....63.00
Seattle B3 .....82.00
So.Chicago C3,R2,W14.63.00
So.Duquesne,Pa. C3 ..63.00
So.SanFrancisco B3 ...82.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2, T7 ....66.00
Conshohocken,Pa. A3..70.00
Detroit R7 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....66.00
Houston,Tex. S5 .....74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....86.00
Massillon,O. R2 .....66.00
Midland,Pa. C18 .....66.00
Munhall,Pa. C3 .....66.00
Sharon,Pa. S3 .....66.00
So.Chicago C3,R2,W14.66.00
So.Duquesne,Pa. C3 ..66.00
Warren,O. C17 .....66.00
Youngstown Y1 .....66.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Fontana,Calif. K1 ....100.00
Gary,Ind. C3 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00
So.Duquesne,Pa. C3 ...76.00

SHEETS BARS (NT)
Fontana,Calif. K1 ....$86.00

SKELP
Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.15
Warren,O. R2 .....3.15
Youngstown C3, R2 ....3.15

WIRE RODS
AlabamaCity,Ala. R2 ..3.85
Buffalo W12 .....3.85
Cleveland A7 .....3.85
Donora,Pa. A7 .....3.85
Fairfield,Ala T2 .....3.85
Fontana,Calif. K1 .....4.60
Houston,Tex. S5 .....4.25
Ind.Harbor,Ind. Y1 ....3.85
Johnstown,Pa. B2 ....3.85
Joliet,Ill. A7 .....3.85
LosAngeles B3 .....4.65
Minnequa,Colo. C10 ....4.10
Monessen,Pa. P7 .....3.85
No.Tonawanda,N.Y. B11.3.85
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J. R5 .....3.95
So.Chicago,Ill. R2 ....3.85
SparrowsPoint,Md. B2 .3.95
Sterling,Ill.(1) N15 ....3.85
Struthers,O. Y1 .....3.85
Torrance,Calif. C11 ...4.65
Worcester A7 .....4.15

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Bessemer,Ala. T2 .....3.40
Bethlehem,Pa. B2 .....3.45
Clairton,Pa. C3 .....3.40
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2 ....3.40
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.00
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.00
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.40
Niles,Calif.(22) P1 ....4.02
Phoenixville,Pa. P4 ....4.25
Portland,Oreg. O4 .....4.05
Seattle B3 .....4.05
So.Chicago,Ill. C3, W14.3.40
So.SanFrancisco B3 ....3.95
Torrance,Calif. C11 ....4.00
Weirton,W.Va. W6 .....3.40

Alloy Stand. Shapes
Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.15
Bessemer,Ala. T2 .....5.15
Bethlehem,Pa.(14) B2 ..5.20
Clairton,Pa. C3 .....5.15
Fairfield,Ala. T2 .....5.15
Fontana,Calif. K1 .....5.75
Gary,Ind. C3 .....5.15
Geneva,Utah G1 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y.(14)B2 5.20
LosAngeles B3 .....5.75
Munhall,Pa. C3 .....5.15
So.Chicago,Ill. C3 .....5.15
So.SanFrancisco B3 ....5.70
Struthers,O. Y1 .....5.15

Wide Flange
Bethlehem,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 .....3.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
Munhall,Pa. C3 .....5.10
So.Chicago,Ill. C3 .....5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 .....4.20
So.Chicago,Ill. C3 .....4.20
Weirton,W.Va. W6 .....4.20

BEARING PILES
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 .....3.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.35
Bessemer,Ala. T2 .....5.35
Clairton,Pa. C3 .....5.35
Cleveland J5, R2 .....5.35
Conshohocken,Pa. A3 ..5.35
Ecorse,Mich. G5 .....5.60
Fairfield,Ala. T2 .....5.35
Fontana,Calif. K1 .....5.95
Gary,Ind. C3 .....5.35
Geneva,Utah G1 .....5.35
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 .....5.35
Munhall,Pa. C3 .....5.35
Pittsburgh J5 .....5.35
Sharon,Pa. S3 .....5.35
So.Chicago,Ill. C3 .....5.35
SparrowsPoint,Md. B2..5.35
Warren,O. R2 .....5.35
Youngstown Y1 .....5.35

PLATES, Open-Hearth Alloy
Claymont,Del. W16 ....4.50
Coatesville,Pa. L7 .....4.80
Conshohocken,Pa. L7 ...4.55
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

FLOOR PLATES
Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....5.25
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

PLATES (Universal Mill)
Fontana,Calif. K1 ....4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.25

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 .....3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 .....3.50
Clairton,Pa. C3 .....3.50
Claymont,Del. W16 ....3.90
Cleveland J5 R2 .....3.50
Coatesville,Pa. L7 .....3.90
Conshohocken,Pa. A3 ...3.75
Ecorse,Mich. G5 .....3.75
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.50
Geneva,Utah G1 .....3.50
Harrisburg,Pa. C5 .....4.25
Houston,Tex. S5 .....3.90
Ind.Harbor,Ind. I-2, Y1..3.50
Johnstown,Pa. B2 .....3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.50
Pittsburgh J5 .....3.50
Seattle B3 .....4.40
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2 ..3.50
Steubenville,O. W10 ....3.50
Warren,O. R2 .....3.50
Weirton,W.Va. W6 .....3.50
Youngstown C3, R2, Y1.3.50

PLATES, Wrought Iron
Economy,Pa. B14 ....7.85

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.75
Ashland,icl(15) A10 ....4.25
Cleveland,cl R2 .....4.10
Warren,O.cl R2 .....4.10

BARS, Hot-Rolled Carbon
AlabamaCity, Ala. R2 ..3.45
Aliquippa,Pa. J5 .....3.45
Alton,Ill(1) L1 .....3.45
Atlanta,Ga. A11 .....3.60
Bessemer,Ala. T2 .....3.45
Buffalo R2 .....3.45
Canton,O. R2 .....3.45
Clairton,Pa. C3 .....3.45
Cleveland R2 .....3.45
Ecorse,Mich. G5 .....3.65
Emeryville,Calif. J7 ....4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
Seattle B3, N14 .....4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 ....3.45
S.SanFran.,Cal. B3 ....4.20
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 ....3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.45
Atlanta A11 .....3.60
Johnstown,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Niles,Calif. P1 .....4.17
Pittsburgh(23) J5 ....3.45
Portland,Oreg. O4 .....4.20
SanFrancisco S7 .....4.00
Weirton,W.Va. W6 ....3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....3.95
Buffalo R2 .....3.95
Canton,O. R2, T7 .....3.95
Clairton,Pa. C3 .....3.95
Ecorse,Mich. G5 .....4.25
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....3.95
Houston,Tex. S5 .....4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 .....3.95
KansasCity, Mo. S5 ....4.55
Lackawanna,N.Y. B2 ..3.95
LosAngeles B3 .....5.00
Massillon,O. R2 .....3.95
Midland,Pa. C18 .....3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 ....3.95
Struthers,O. Y1 .....3.95
Warren,O. C17 .....3.95
Youngstown C3 .....3.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 .....4.20
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....4.20
Youngstown C3 .....4.20

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.20
Atlanta A11 .....5.35
Bessemer,Ala. T2 .....5.20
Bethlehem,Pa. B2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland R2 .....5.20
Ecorse,Mich. G5 .....5.40
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....6.25
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
LosAngeles B3 .....5.90
Pittsburgh J5 .....5.20
So.Duquesne,Pa. C3 ....5.20
So.SanFrancisco B3 ....5.95
Struthers,O. Y1 .....5.20
Youngstown C3 .....5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 .....4.15
Ambridge,Pa. W18 ....4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 .....4.15
Camden,N.J. P13 .....4.60
Carnegie,Pa. C12 .....4.15
Chicago W18 .....4.15
Cleveland A7, C20 ....4.15
Detroit P17 .....4.30
Donora,Pa. A7 .....4.15
Ecorse,Mich. G5 .....4.35
Elyria,O. W8 .....4.15
FranklinPark,Ill. N5 ...4.15
Gary,Ind. R2 .....4.15
Hammond,Ind. L2, M13.4.15
Hartford,Conn. R2 ....4.55
Harvey,Ill. B5 .....4.15
LosAngeles R2 .....5.55
Mansfield,Mass. B5 ....4.55
Massillon,O. R2, R8 ...4.15
Midland,Pa. C18 .....4.15
Monaca,Pa. S17 .....4.15
Newark,N.J. W18 ....4.55
Plymouth,Mich. P5 ....4.40
Pittsburgh J5 .....4.10
Putnam,Conn. W18 ....4.55
Readville,Mass. C14 ....4.55
St.Louis,Mo. M5 .....4.55
So.Chicago,Ill. W14 ...4.15
SpringCity,Pa.(5) K3 ..4.55
Struthers,O. Y1 .....4.15
Waukegan,Ill. A7 .....4.15
Youngstown F3, Y1 ....4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .....4.90
Ambridge,Pa. W18 ....4.90
BeaverFalls,Pa. M12 ...4.90
Bethlehem,Pa. B2 .....4.90
Buffalo B5 .....4.90
Canton,O. R2, T7 .....4.90
Carnegie,Pa. C12 .....4.90
Chicago W18 .....4.90
Cleveland A7, C20 .....4.90
Detroit P17 .....5.05
Donora,Pa. A7 .....4.90
Elyria,O. W8 .....4.90
Gary,Ind. R2 .....4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 .....5.20
Harvey,Ill. B5 .....4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 ....5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 .....4.90
Monaca,Pa. S17 .....4.90
Newark,N.J. W18 .....5.20
Plymouth,Mich. P5 ....5.10
So.Chicago,Il. R2, W14.4.90
Struthers,O. Y1 .....4.90
Warren,O. C17 .....4.90
Waukegan,Ill. A7 .....4.90
Worcester,Mass. A7 ....5.20
Youngstown F3, Y1 ....4.90

RAIL STEEL BARS
ChicagoHts.(3,4)C2,I-2 .3.45
Dallas,Tex(4) S20 .....6.00
Franklin,Pa.(3, 4) F5..3.70
FortWorth,Tex.(26) T4..4.33
Huntngtn,W.Va.(3) W7.4.00
Marion,O.(3) P11 .....3.70
Moline,Ill.(3) R2 .....3.55
Williamsport(3) S19 ....4.25

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.8.60
Economy,Pa.(D.R.)B14 11.00
Economy(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 ..12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ...3.45
Alton,Ill.(6) L1 .....3.45
Atlanta A11 .....3.60
Buffalo R2 .....3.45
Cleveland R2 .....3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.45
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.17
Pittsburgh,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
SandSprings,Okla. S5 ..4.35
Seattle B3, N14 .....4.20
So. Chicago,Ill. R2 ....3.45
So.Duquesne,Pa. C3 ....3.45
So.SanFrancisco B3 ....4.20
SparrowsPoint,Md. B2 ..3.45
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Youngstown C3, R2 ....3.45

BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ...4.35
LosAngeles B3 .....5.00
Marion,O. P11 .....4.50
Seattle B3, N14 .....5.10
So.SanFrancisco B3 ....5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 .....3.35
Cleveland J5, R2 .....3.35
Conshohocken,Pa. A3 ...3.60
Detroit M1 .....4.15
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.25
Gary,Ind. C3 .....3.35
Geneva,Utah G1 .....3.45
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 .....3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 .....3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ....3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 .....3.35
Weirton,W.Va. W6 ....3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 .....4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 .....4.15
Niles,O. N12 .....4.10
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14 ga., heavier) High-strength Low-Alloy
Cleveland J5, R2 .....5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 .....5.25
Fairfield,Ala. T2 .....5.05
Fontana,Calif. K1 .....6.74
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2, Y1.5.05
Irvin,Pa. C3 .....5.05
Lackawanna(35) B2 ...5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.05
So.Chicago,Ill. C3 ....5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 ....5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.20
Ecorse,Mich. G5 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, Y1.6.20
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ....6.20
Pittsburgh J5 .....6.20
SparrowsPoint(38) B2...6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 ....6.20
Youngstown Y1 .....6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky. (8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo, Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin, Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

BLUED STOCK, 29 Ga.

Yorkville,O. W10	6.00

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance, Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45
Fairfield,Ala. T2	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Wrought Iron	An'l	Galv.
Apollo,Pa. B14	12.00	15.50

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif C11	4.05

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Well Casing

Fontana, Calif. K1	4.80

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor, Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Parkersburg F4 (cut lengths)	...	...	...	...	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.20	14.70
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2.	7.40	7.60
Gary, C3	7.30	7.50
Ind.Harbor I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10.	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity, Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11	5.10
Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	5.70
Sharon,Pa. S3	4.95
So.SanFrancisco(25) B3	5.70
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.25
Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.50
Buffalo(27) R2	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.50
Conshohocken,Pa. A3	3.50
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.50
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.50
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Fontana,Calif. K1	11.15
Harrison,N.J. C18	9.50
NewBritn.Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.50	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.50	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.15	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.50
Berea,O. C7	5.60
Bridgeprt,Conn.(10) S15	4.50
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.75
Detroit D2	4.75
Detroit M1	4.95
Dover,O.(40) G6	4.50
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.50
Fontana,Calif. K1	5.75
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.85
Mattapan,Mass. T6	5.00
Middletown,O. A10	4.15
NewBritain(10) S15	4.50
NewCastle,Pa. B4	4.50
NewCastle,Pa.(40) E5	4.50
NewHaven,Conn. D2	5.00
NewHaven,Conn. A7	4.65
NewYork W3	5.00
Pawtucket,R.I. R3	5.15
Pawtucket,R.I.(21) N8	5.00
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.50
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	5.00
Warren,O.(40) T5	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.15
Youngstown C8, (40)	4.50
Youngstown Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11	3.40
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	3.65
Youngstown C3	3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass.(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Williamsport,Pa. B2	6.00
Worcester A7,J4,T6,W12	6.20
Worcester,Mass. N6	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	6.00
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7,T6	8.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.55
Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20, R2	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet, Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-8ga. I-1	5.15
No. Tonawanda B11	4.50
Palmer, Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7	4.80
Worcester,Mass. T6	4.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.15
Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy.Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Bartonville,Ill. K4	126
Crawfordsville M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Marion,O. P11	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	130

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116
Sterling,Ill.(1) N15	116

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

AXLES

Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	*4.00*

NAILS & STAPLES, Stock To dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	111
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	9.10
Pittsburgh O3, P14	9.10
Seattle B3	9.35

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50-31.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, T7, U4, V2, V3

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (⅝" bar, elec. furn. billet, 5.03c); to consumers, 5.08c.
(27) Bar mill sizes.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.75c. 0.035" and heavier.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	33.5	5.5	3.5	5.5
¼	6.0	0.42	33.5	31.5	30.5	5.5	3.5	6.5
⅜	6.0	0.57	29.0	27.0	26.0	0.5	+1.5	2.5
½	8.5	0.85	40.5	38.5	39.5	21.0	19.0	20.0
¾	11.5	1.13	43.5	41.5	42.5	25.0	23.0	24.0
1	17.0	1.68	46.0	44.0	45.0	28.0	26.0	27.0
1¼	23.0	2.28	46.5	44.5	45.5	28.5	26.5	27.5
1½	27.5	2.73	47.0	45.0	46.0	29.0	27.0	28.0
2	37.0	3.68	47.5	45.5	46.5	29.5	27.5	28.5
2½	58.5	5.82	48.0	46.0	47.0	30.0	28.0	29.0
3	76.5	7.62	48.0	46.0	47.0	30.0	28.0	29.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 points lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 43% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1.

Column D: Etna, Pa. N2; Monaca, Pa. quotes 1 pt lower on ½" through 3", P9; Sharon, Pa. M6, quotes 1 pt lower on ⅛", 1 pt higher on ⅜" and 1 pt lower on ½" through 3"; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., W10 except 3½ pts lower on ⅛", 2½ pts lower on ¼", 3 pts lower on ⅜" Wheatland, Pa., except 2 pts lower on ⅛", ¼" and ⅜"; W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 24.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 8 pts lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	17.5	36.0	17.5
2½	58.5	5.82	39.0	20.5	39.0	20.5
3	76.5	7.62	39.0	20.5	39.0	20.5
3½	92.0	9.20	41.0	22.5	41.0	22.5
4	$1.09	10.89	41.0	22.5	41.0	22.5
5	1.48	14.81	41.0	22.5	41.0	22.5
6	1.92	19.18	41.0	22.5	41.0	22.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, N3; Youngstown, Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both Sides	Strip Copper Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	....	19.75	21.50–24.00	75.00
304	23.50	28.00	....	....	20.75–23.50	22.50–25.5	77.00
305	....	....	....	....	....	....	79.00
309	29.00	33.50	....	....	....	....	....
310	35.00	39.50	....	....	....	....	105.00
316	28.00	32.50	....	....	26.00	28.00–34.5	....
317	33.00	37.50	....	....	....	....	....
318	32.00	36.50	....	....	....	....	....
321	25.00	29.50	....	....	23.00	25.00	90.00
347	26.00	30.50	....	....	24.00	26.00–31.5	94.00
405	19.75	26.25	....	....	....	....	....
410	19.25	25.75	....	....	....	....	....
430	19.25	25.75	....	....	....	....	....
Nickel	31.00	41.00	31.50	41.00	....	....	88.00
Inconel	39.00	51.00	....	....	....	....	140.00
Monel	32.00	42.00	26.50	33.50	....	....	83.00
Copper*	....	....	20.70†	25.65‡	....	....	....

* Deoxidized. † 17.20c for hot-rolled. ‡ 22.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	27
⅝-in. & ⅞-in.	29
¾-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage	26
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up bolts	37

NUTS

H.P. & C.P. Reg. & Heavy Square:	
½-in. and smaller	25
⅝-in. & ⅞-in.	23
¾-in.-1½-in.	23
1⅝ in. and larger	16

H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅞-in.	28	25
¾-in.-1½-in.	25	23
1⅝ in. & larger	17	16

C.P. Hex:		
½-in. & smaller	33	29
⅝-in. & ⅞-in.	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
⅝-in. & ⅞-in.	30	36	36
¾-in.-1½-in.	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	63.5 & 10
Plated finishes	50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅞-in.	50
¾-in. through 1 in.	43
Longer than 6 in.:	
¼-in. through ⅞-in.	33
¾-in. through 1 in.	13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	46
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams.	18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.25c

⅞-in., under .....43 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....List to 50c off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	39.00	32.00	30.00
302...	39.00	34.50	30.00
303...	41.00	38.00	32.50
304...	41.00	36.50	31.50
309...	53.50	52.50	43.00
316...	54.50	56.50	47.50
321...	47.00	46.00	35.50
347...	51.50	50.00	40.00
410...	34.50	28.50	24.50
416...	35.00	35.00	25.00
420...	42.00	45.00	30.00
430...	37.00	29.00	25.00
501...	25.50	24.00	13.00
502...	26.50	25.00	14.00

Baltimore, Types 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416, S18.

Cleveland, strip A7.

Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.

Dunkirk,N.Y., bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Harrison, N. J., Types 302, 304, 316 wire and strip D6.

Massillon, all products R2.

McKeesport, Pa., bars; sheets except Type 416 C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip C4.

So. Chicago, Ill., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars except Type 309 43.50c, type 316 48.50c U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 59.50c, strip 61.50c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 25.00

Toluol, one deg...18.25-25.75

Industrial xylol ..19.75-27.50

Per ton bulk, ovens

Sulphate of ammonia..$32-45

Cents per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.50

Do., less than carlots..14.25

Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $39; less than 60%, $36.

Imported, net ton, duty paid, metallurgical grade, $28-$29.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge Iron:	Cents
98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe(minus 325 mesh)	48.50
Powder Flakes	44.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots	28.50-31.25
Copper:	
Electrolytic	33.75
Reduced	33.50
Lead	20.50
Manganese:	
Minus 100-mesh	52.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed	75.50
Nickel-Silver, 10-ton lots	41.75
Silicon	34.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Tin	$1.20
Zinc, 10-ton lots	20.50-28.00
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb	3.00
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	2.90
less than 1000 lb	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil,fur.	$14.00-14.50
Connellsvil,fdry.	15.00-16.00
New River, foundry	19.00
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens New England, del.	‡23.40
Chicago, ovens	21.00
Chicago del.	†22.45
Detroit, del.	24.91
Terre Haute, ovens	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	20.75
Chicago, del.	24.12
Cincinnati, del.	23.67
Detroit, del.	24.65
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painesville, O., ovens	21.90
Buffalo, del.	24.02
Cleveland, del.	23.62
Erie, del.	22.04
Birmingham, ovens	19.15
Birmingham, del.	20.20
Philadelphia, ovens	21.25
Neville Island,Pa.,ovens	21.00
Swedeland, Pa., ovens	21.20
St. Louis, ovens	22.99
St. Louis, del.	24.12
Portsmouth, O., ovens	20.15
Cincinnati, del.	22.71
Detroit, ovens	21.65
Detroit, del.	*22.65
Buffalo, del.	24.69
Flint, del.	24.09
Pontiac, del.	23.04
Saginaw, del.	24.40

Includes representative switching charge of: *, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York(city)	5.82	6.84	7.73	6.14	...	5.97	6.64	8.60	5.95	6.18	7.64
New York(c'try)	5.52	6.64	7.53	5.84	...	5.67	6.44	8.40	5.65	5.88	7.34
Boston (city) ..	5.95	6.75	7.37	5.90	...	5.80	6.39	8.70	5.95	6.28	7.48
Boston (c'try) .	5.75	6.55	7.17	5.70	...	5.60	6.19	8.50	5.75	6.08	7.28
Phila. (city) ..	6.60-6.70	6.75	7.10	5.90	...	5.85	6.46	8.40	5.70	5.90	7.00
Phila. (c'try)..	6.35-6.45	6.50	6.85	5.65	...	5.60	6.21	8.15	5.45	5.65	6.75
Balt. (city) ...	5.35	6.59	6.66	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.46	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va..	5.35	...	6.90	5.63	...	5.53	6.30	...	5.63	5.45	7.13
Wash. (w'hse).	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††[5]	5.55	5.85	7.15
Buffalo (w'hse).	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††[5]	5.35	5.65	6.95
Pitts. (w'hse)..	5.15	5.95*	6.60-6.70	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse)	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††[5]	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.30	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse).	5.15	5.95	7.10	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city)..	5.57	6.14	6.54	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	7.05	5.30	...	5.30	5.85	9.75††[5]	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.85	5.10	...	5.10	5.65	9.55††[5]	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	6.94	5.44	...	5.44	6.09	9.89††[5]	5.59	5.74	6.94
Milwau. (c'try)	5.29	6.09	7.14	5.24	...	5.24	5.89	9.69††[5]	5.39	5.54	6.74
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[5]	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[5]	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[2]	5.25	...	5.25	6.88	...	5.40	5.55	7.83
Birm'hm(w'hse)	5.15	5.95	6.15[2]	5.10	...	5.10	...	...	5.25	5.40	...
Los Ang. (city)	6.10	7.65	8.20	6.15	8.90	6.10	7.75	...	6.10	6.20	8.40
L. A. (w'hse)..	5.90	7.45	8.00	5.95	8.70	5.90	7.55	...	5.90	6.00	8.20
San Francisco .	6.50[9]	7.60[3]	7.50[3]	7.45[9]	8.25[3]	6.30[9]	7.55	...	6.30[9]	6.40[9]	8.50[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $68; chemical-bonded chrome brick, $72; magnesite brick, $94; chemical-bonded magnesite, $83.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ¾" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Bonne Terre, Mo., Blue Bell, Williams, Millville, W. Va., Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Mo., $12.45; Martin, Millersville, Narlo, Clay Center, and Bettsville, O., Billmeyer, Plymouth Meeting, Pa., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Chinese	$29.00-$30.00
Brazilian	29.00-30.00
Bolivian	29.00-30.00
Domestic scheelite, del.	32.00

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb. molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces, $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 29.75c; ton lot 31.25c; less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 141)

Controls Over Metals Needed

Producer urges prompt decision by government on allocation of metals to meet military requirements. Supplies inadequate to meet these plus stockpiling and civilian needs

New York — A decision must be reached soon on allocation of nonferrous metals. Shortages have become critical.

The Munitions Board has taken action to stimulate production, but this will not be reflected in supplies on the open market for many weeks. The Board removed the limitation of 25 per cent above the market price for the purchase of strategic and critical materials of domestic origin for the national stockpile. It was found some materials could not be produced at the price levels provided by the limitation. This will hasten reopening of some marginal mines and will be an incentive to boost output at high-cost mines already in production.

The Economic Controls bill, now under consideration in Congress, contains a provision for loans for the exploration, development and mining of strategic metals and minerals. The Interior Department will have an organization set up within ten days after passage of this bill to carry out this particular provision.

Three Alternatives Suggested—To meet military requirements either the rate of stockpiling must be slowed or civilian requirements must be reduced from the level of recent months. This opinion was expressed by Simon D. Strauss, vice president, American Smelting & Refining Co., at the first general session of the American Mining Congress convention in Salt Lake City, Utah, last week.

He suggested three means by which stockpiles could be increased at the expense of civilian consumption, if that is the government's choice: Civilian buying of housing, automobiles and major household appliances can be reduced by tightening of credit controls; production of cars and appliances can be limited by establishment of a quota system; scarce materials can be placed under direct allocation and price controls.

"The choice is up to the government," Mr. Strauss said, "and the sooner it is made and implemented the better the chance of avoiding disastrous inflation."

Metal Prices May Zoom

New York—Dual and premium prices are prevalent in several major metal markets. While most producers are trying to hold price lids down, pressure from short consumers is so strong the price structure is cracking and may give way. Higher prices were paid last week for zinc, tungsten, platinum, manganese and imported antimony.

Until the tariff issue is settled, price confusion will reign in copper. Combined Metals Reduction Co., Salt Lake City, Utah, has sold regular and special high grade zinc on basis of 17.60c and 17.75c, respectively; most other sellers are on basis of 16.10c and 16.25c. Some sellers have paid up to 25.00c for special high grade in resale lots. Shortage of zinc is a matter of ore supply rather than smelting capacity.

An increase in lead price is freely predicted, which would bring out more metal.

Tin is unsettled with price changes less violent. Undertone was weaker on increased offerings by the British Ministry of Supply and by resumption of sale of tin below grade A quality by RFC.

Platinum price was boosted $13 an ounce by a leading refiner to $87 for small lots and $90 for bulk quantities. Metal is available at these prices only for industrial purposes. Dealers are selling platinum to jewelry makers up to $102.50 an ounce.

Jamaica To Get Alumina Plant

Montreal, Que. — Aluminum Ltd. will commence immediately ordering equipment and detailed engineering planning for the first alumina plant in the British West Indies. The plant will be built in Jamaica at initial cost of about $8 million. Considerable portion of the equipment will be obtained from United Kingdom.

Bauxite mining facilities and a new-type plant for conversion of bauxite into alumina will be built in the colony by the company's wholly owned subsidiary, Aluminum Bauxites Ltd., whose contract with the Economic Cooperation Administration has been announced in London and Washington.

Some $1.5 million in capital costs over and above the loan made by ECA will be advanced by Aluminum Ltd. The plant will have capacity of 100 tons of alumina per day. If the process is successful and market conditions warrant operations could be expanded tenfold, with an additional investment of up to $30 million.

War Metal Controls Reviewed

Danbury, Conn.—John W. Douglas, president, Republic Foil & Metal Mills Inc., this city, published a 56-page booklet containing "a general study of the formation and development of the War Production Board with specific relationship to copper, copper products, and finished products made therefrom."

The author, formerly chief of the Brass Mill Branch and assistant director of the Copper Division, WPB, prepared the booklet with the idea a review of experiences in that conflict may help to avoid some of the problems, confusions, and resulting production losses which almost cost us that war.

Greenfield Improves Plant

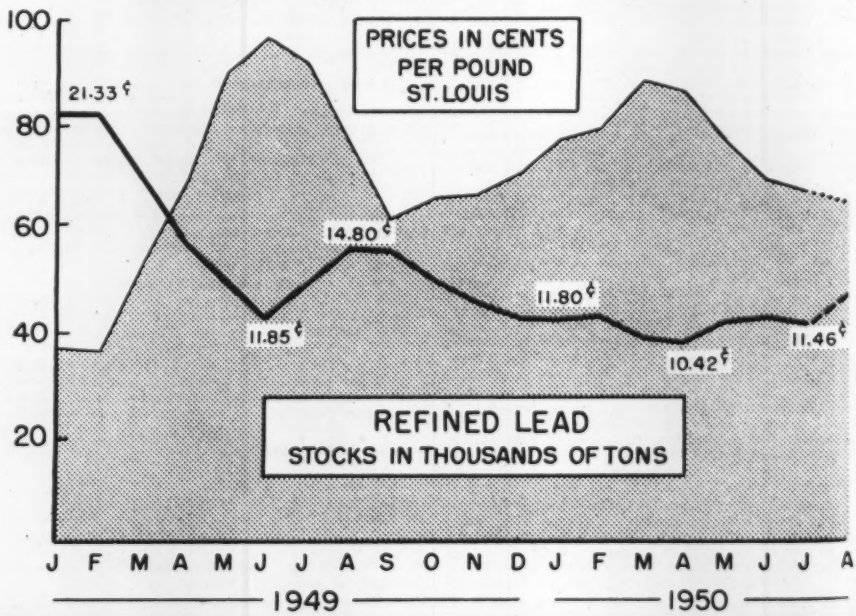
Buffalo — Samuel Greenfield Co. Inc., this city, refiners and smelters of nonferrous metals, is modernizing its plant at 31 Stone St. at a cost of more than $100,000. The modernization program includes replacement of 12 of its 14 smelting furnaces and the installation of chain conveying equipment. The company is booked to capacity until November.

Titanium Output Increasing

Niagara Falls, N. Y.—Production of titanium is being increased at the local plant of Titanium Alloy Mfg. Division, National Lead Co. National Lead has begun construction of new facilities for production of titanium pigments. The additional capacity is expected to increase the present rate by 60,000 to 70,000 tons annually.

Lead Prices Move Upward as Stocks Dip

. . . shortage is aggravated by stockpiling needs



NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 22.50-24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingot: 85-5-5-5 (No. 115) 25.50c; 88-10-2 (No. 215) 35.00c; 80-10-10 (No. 305) 29.50c; No. 1 yellow (No. 405) 21.75c.

Zinc: Prime western 15.00c; brass special 15.25c; intermediate 15.50c, East St. Louis; high grade 16.10-17.60c delivered.

Lead: Common 13.80c; chemical 13.90c; corroding 13.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.50c, pigs 16.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 24.50-24.75c; No. 12 foundry alloy (No. 2 grade) 24.00c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.00c; grade 2 24.00-24.50c; grade 3, 23.25-23.50; grade 4, 23.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 22.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt and September 98.50c, October 98.00c, November 97.50c, December 97.00c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%; Chinese 22.00c; English, 23.00c; Belgian, 23.00c, duty paid, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.

Mercury: Open market, spot, New York $77-$80 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $30.00 per lb contained Be, f.o.b., Cleveland and Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.15 del.; special or patented shapes, $2.30.

Cobalt: 97-99%, $1.80 per lb for 500 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $87-$90 per ounce from refiners.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 22.50-cent copper.)

Sheet: Copper 37.43; yellow brass 34.19; commercial bronze, 95%, 37.38; 90%, 36.93; red brass, 85% 35.96; 80%, 35.52; best quality, 35.04; nickel silver, 18%, 48.39; phosphor-bronze, grade A, 5% 55.11.

Rods: Copper, hot-rolled 33.28; cold-drawn 34.53; yellow brass free cutting, 28.54; commercial bronze, 95% 37.07; 90% 36.62; red brass 85% 35.65; 80% 35.21.

Seamless Tubing: Copper 37.47; yellow brass 37.20; commercial bronze 90% 39.59; red brass 85% 38.87; 80% 38.43.

Wire: Yellow brass 34.48; commercial bronze, 95% 37.67; 90% 37.22; red brass, 85% 36.25; 80% 35.81; best quality brass 35.33.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 26.67, l.c.l. 27.17, 100,000 lb lots 26.545; weatherproof, f.o.b. eastern mills, c.l. 28.10, l.c.l. 28.60, 100,000 lb lots 27.85; magnet, del., 15,000 lb or more 32.50, l.c.l. 33.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	....	....
0.135-0.096	12-48	27.9	....	....
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $19.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $19.00 per cwt. Traps and bends: List prices plus 55%.

ZINC

Sheets, 20.75c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 20.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 19.00c; over 12-in., 20.00c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 75.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 53.00c. Strip, cold-rolled 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb. 55.00-59.00c; 25 to 99 lb. 45.00-49.00c; 100 lb to 5000 lb. 38.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 34.09c; oval 33.59c; cast 32.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 51.40c, under 1000 lb 49.40c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 28.00c; over 200 lb, 27.00c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 65.00c; 10,000 to 30,000 lb, 63.00c; 3000 to 10,000 lb, 67.00c, 500 to 3000 lb, 68.00c; 100 to 500 lb, 70.00c; under 100 lb, 73.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 29.50c; 400-lb bbl. 27.50c up to 10,000 lb, 27.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 44.6c, 10 or more drums 42.6c, f.o.b. Niagara Falls, N. Y.; 45.85c and 43.85c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Heavy Clean	Ends Rod	Turnings Clean
Copper	21.50	21.50	20.75
Yellow Brass	18.125	17.875	16.75
Commercial Bronze			
95%	20.375	20.125	19.625
90%	20.125	19.875	19.375
Red brass			
85%	19.875	19.625	19.125
80%	19.50	19.25	18.75
Muntz metal	16.875	16.625	16.125
Nickel, silver, 10%	20.50	20.25	10.25
Phos. bronze, A	21.625	21.375	10.81¼

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; composition red brass 18.75-19.00; radiators 15.00; heavy yellow brass 14.25-14.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; refinery brass (60% copper) per dry copper content 20.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 19.75-20.00; No. 2 18.50-18.75; light copper 17.50-17.75; No. 1 composition red brass 16.25-16.50; No. 1 composition turnings 15.75-16.25; mixed brass turnings 10.25-10.50; new brass clippings 17.12½-17.37½; No. 1 brass rod turnings 15.25-15.50; light brass 10.00-10.25; heavy yellow brass 11.75-12.00; new brass rod ends 15.50-15.75; auto radiators, unsweated 12.50-12.75; cocks and faucets, 14.50-14.75; brass pipe 15.50-15.75.

Lead: Heavy 11.50-11.75; battery plates 6.75-7.00; linotype and stereotype 13.00-13.25; electrotype 11.25-11.50; mixed babbitt 10.75-11.00.

Zinc: Old zinc 8.50-8.75; new die cast scrap 8.25-8.50; old die cast scrap 5.50-5.75.

Tin: No. 1 pewter 55.00-57.00; block tin pipe 75.00-77.00; No. 1 babbitt 50.00-52.00.

Aluminum: Clippings 2S 13.00; old sheets 10.00; crankcase 10.00; borings and turnings 6.50.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Aug. 31	22.50-24.50	13.80	15.00	98.50	17.50	24.50	48.00	72.75
Aug. 30	22.50-24.50	13.80	15.00	101.00	17.50	24.50	48.00	72.75
Aug. 28-29	22.50-24.50	13.80	15.00	102.00	17.50	24.50	48.00	72.75
Aug. 25-26	22.50-24.50	13.80	15.00	104.50	17.50	24.50	48.00	72.75
Aug. 24	22.50-24.50	13.80	15.00	104.00	17.50	24.50	48.00	72.75
Aug. 23	22.50-24.50	13.80	15.00	102.50	17.50	24.50	48.00	72.75
Aug. 22	22.50-24.50	13.80	15.00	106.00	17.50	24.50	48.00	72.75
Aug. 21	22.50-24.50	13.80	15.00	107.75	17.50	24.50	48.00	72.75
Aug. 18-19	22.50	12.80	15.00	102.00	17.50	24.50	48.00	72.75
Aug. 17	22.50	12.80	15.00	101.00	17.50	24.50	48.00	72.75
Aug. 16	22.50	12.80	15.00	105.00	17.50	24.50	48.00	72.75
Aug. 15	22.50	12.80	15.00	107.50	17.50	24.50	48.00	72.75
Aug. 14	22.50	11.80	15.00	106.00	17.50	24.50	48.00	72.75
Aug. 11-12	22.50	11.80	15.00	105.00	17.50	24.50	48.00	72.75
Aug. 10	22.50	11.80	15.00	103.00	17.50	24.50	48.00	72.75
Aug. 9	22.50	11.80	15.00	101.50	17.50	24.50	48.00	72.75
Aug. 8	22.50	11.80	15.00	99.25	17.50	24.50	48.00	72.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers commissions, as reported to STEEL, Aug. 31, 1950; gross tons
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Aug. 31	$40.92
Aug. 24	42.50
July 1950	37.04
Aug. 1949	20.86
Aug. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$44.00*
No. 2 Bundles	*37.00*
No. 1 Busheling	*44.00*
No. 1 Bundles	*44.00*
No. 2 Bundles	*37.00*
Heavy Turnings	43.00-44.00
Machine Shop Turnings	34.00-35.00†
Mixed Borings, Turnings	34.00-35.00†
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos. Steel	50.00-51.00

Cast Iron Grades

No. 1 Cupola Cast	44.00-45.00
No. 1 Machinery Cast.	50.00-51.00
Charging Box Cast	43.00-44.00
Heavy Breakable Cast.	41.00-42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	47.50-48.50
Rails, Random Lengths	48.50-49.00
Rails, 2 ft. and under.	52.00-52.50
Rails, 18 in. and under	52.50-53.00
Railroad Specialties	52.00-52.50

† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$41.50-42.00*
No. 2 Heavy Melt. Steel	38.50-39.00
No. 1 Busheling	43.00-43.50
No. 1 Bundles	43.00-43.50
No. 2 Bundles	31.00-32.00
Machine Shop Turnings	29.50-30.00
Mixed Borings, Turnings	33.00-33.50
Short Shovel Turnings.	33.00-33.50
Cast Iron Borings	33.00-33.50
Low Phos.	44.00-44.50

Cast Iron Grades

No. 1 Cupola	49.00-50.00
Charging Box Cast	44.00-45.00
Stove Plate	43.00-44.00
Heavy Breakable Cast.	41.00-42.00
Unstripped Motor Blocks	35.00-36.00
Brake Shoes	39.00-40.00
Clean Auto Cast	50.00-51.00
No. 1 Wheels	44.00-45.00
Burnt Cast	39.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	46.00-46.50
R.R. Malleable	49.00-50.00
Rails, 3 ft and under..	53.00-54.00
Rails, 18 in. and under	55.00-56.00
Rails, Random Lengths	50.00-51.00
Cast Steel	48.00-49.00
Railroad Specialties	49.00-50.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	51.00-51.50

VALLEY

No. 1 Heavy Melt. Steel	*$43.50-44.00*
No. 2 Heavy Melt. Steel	39.50-40.00
No. 1 Bundles	46.00-46.50
Facty. Prod. Bundles..	47.00-47.50
No. 2 Bundles	34.00-34.50
Machine Shop Turnings.	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	36.00-36.50
Low Phos.	46.50-47.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	47.00-47.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$38.00-39.00*
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	37.00
No. 1 Bundles	*38.00-39.00*
No. 2 Bundles	31.00-32.00
Machine Shop Turnings	30.00
Short Shovel Turnings.	32.00
Mixed Borings, Turnings	28.00-28.50
Low Phos. Punchings and Plate, elec. fur. grade	*46.00*
Low Phos. Plate, 5 ft & Under	*45.00*
Elec. Furnace Bundles	*40.00-41.00*
Heavy Turnings	38.00
No. 1 Chemical Borings	39.00
Knuckles and couplers.	45.00
Steel car wheels	45.00

Cast Iron Grades

No. 1 Cupola Cast	38.50-39.00
No. 1 Machinery Cast.	43.00
No. 1 Yard Cast	37.00-37.50
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	38.00-39.00
Clean Auto Cast	43.00
No. 1 Wheels	46.00-47.00
Malleable	50.00

CINCINNATI

No. 1 Heavy Melt. Steel	$43.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	43.00
No. 1 Bundles	43.00
No. 2 Black Bundles	37.00
No. 3 Bundles	28.00
Machine Shop Turnings	25.00
Short Shovel Turnings.	28.00
Mixed Borings, Turnings	27.00
Cast Iron Borings	28.00

Cast Iron Grades

No. 1 Cupola Cast	51.00
Charging Box Cast	42.00
Stove Plate	35.00
Heavy Breakable Cast.	42.00
Unstripped Motor Blocks	32.00
Brake Shoes	30.00
Clean Auto Cast	51.00
Drop Broken Cast	53.00
Low Phos., 18 in. and under	52.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00
R.R. Malleable	46.00
Rails, Rerolling	48.00
Rails, Random Lengths.	47.00
Rails, 18 in. and under	55.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$30.00-31.00
No. 1 Bundles	40.00-41.00
No. 2 Bundles	29.00-30.00
No. 1 Busheling	38.00-39.00
Machine Shop Turnings	25.00-26.00
Forge Flashings	37.00-38.00
Short Shovel Turnings.	29.00-30.00
Cast Iron Borings	29.00-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Heavy Breakable Cast.	35.00-36.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$39.50-40.00
No. 2 Heavy Melt. Steel	36.00-36.50
No. 1 Busheling	36.00-36.50
No. 1 Bundles	37.00-37.50
No. 2 Bundles	34.00-34.50
Machine Shop Turnings	30.00-30.50
Mixed Borings, Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Short Shovelings	32.00-32.50
Low Phos.	41.50-42.00

Cast Iron Grades

No. 1 Cupola	38.50-39.00
No. 1 Machinery	41.00-42.00
Malleable	36.00-37.00

Railroad Scrap

Rails, 2 ft. and under.	49.00-50.00
Rails, random size....	44.00-45.00
Railroad Specialties	42.00-43.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$33.00-34.00*
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Busheling	29.00-30.00
No. 1 Bundles	*33.00-34.00*
No. 2 Bundles	27.00-28.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	22.00-23.00
Short Shovel Turnings.	25.00
Punchings & Plate Scrap	36.00-37.00
Low Phos. Plate, 5 ft & under	36.00-37.00
Elec. Furnace Bundles.	35.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-31.00
No. 1 Machinery	32.00
Charging Box Cast	30.00-31.00
Heavy Breakable	30.00-31.00
Unstripped Motor Blocks	*23.00-24.00*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$32.50-33.00*
No. 2 Heavy Melt. Steel	25.50-26.50
No. 1 Bundles	*32.50-33.00*
Machine Shop Turnings	23.00-23.50
Short Shovel Turnings.	25.00-25.50
Mixed Borings, Turnings	*24.50-25.00*
No. 1 Busheling	*31.50-32.00*
Bar Crops and Plate	*37.00-38.00*
Punchings & Plate Scrap	*37.00-38.00*
Chemical Borings	*29.00-30.00*

Cast Iron Grades

No. 1 Cupola Cast	*31.00-32.00*
Mixed Cast	*30.00-31.00*
Heavy Breakable Cast.	28.50-29.00
Stove Plate	29.00-30.00

CHICAGO

No. 1 Heavy Melt. Steel	*$40.00-40.50†*
No. 2 Heavy Melt. Steel	*38.00-39.00†*
No. 1 Bundles	*40.00-41.00†*
No. 2 Bundles	*33.00-34.00†*
Machine Shop Turnings	*33.00-34.00*
Mixed Borings, Turnings	*33.00-34.00*
Short Shovel Turnings	*34.00-35.00*
Cast Iron Borings	*34.00-35.00*
Low Phos.	48.00-49.00
Elec. Furnace Bundles	*41.00-42.00*
Heavy Turnings	*35.00-36.00*
Cut Structurals	44.00-45.00

Cast Iron Grades

No. 1 Cupola Cast	49.00-50.00
Clean Auto Cast	49.50-50.50
No. 1 Wheels	41.00-42.00
Stove Plate	*41.00-42.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.00-45.00
Malleable	53.00-54.00
Rails, Rerolling	*59.00-60.00*
Rails, Random Lengths	*53.00-54.00*
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under.	*60.00-61.00*
Railroad Specialties	49.00-50.00
Angles, Splice Bars	53.00-54.00

† Brokers' buying prices.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$33.00-34.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
No. 2 Bundles	27.00-28.00
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings.	27.00-28.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	41.00-42.00
Cut Structurals	41.00-42.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Stove Plate	37.00-38.00
No. 1 Wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.50-38.00
R.R. Malleable	nominal
Rails, Rerolling	48.00-49.00
Rails, 3 ft and under..	48.00-49.00
Angles and Spice Bars	47.00-48.00

ST. LOUIS

No. 1 Heavy Melt. Steel	*$40.00-41.00*
No. 2 Heavy Melt. Steel	33.00-34.00
No. 1 Bundles	*39.00-40.00*
No. 2 Bundles	33.00-34.00
Machine Shop Turnings	*28.00-29.00*
Short Shovel Turnings	*30.00-31.00*

Cast Iron Grades

No. 1 Cupola Cast	*45.00-46.00*
Charging Box Cast	*40.00-42.00*
Heavy Breakable Cast	*40.00-41.00*
Brake Shoes	*43.00-44.00*
Clean Auto Cast	*42.00-44.00*
Burnt Cast	*38.00-39.00*

Railroad Scrap

R.R. Malleable	*53.00-55.00*
Rails, Rerolling	*57.00-58.00*
Rails, Random Lengths	*51.00-53.00*
Rails, 2 ft and under	*56.00-58.00*
Uncut Tires	*50.00-51.00*
Angles, Splice Bars	*53.00-54.00*
Railroad Specialties	*52.00-54.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Bundles	18.00
No. 2 Bundles	17.00
No. 3 Bundles	15.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	21.50
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	18.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Punchings & Plate Scrap	30.00-32.50
Cut Structurals	30.00-32.50

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00
Heavy Breakable Cast.	30.00
Stove Plate	25.00-27.50
Unstripped Motor Blocks	30.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	35.00
No. 1 Wheels	32.50

Railroad Scrap

No. 1 R.R. Heavy Melt	25.00
Railroad Malleable	30.00
Rails, Random Lengths	26.00
Angles and Splice Bars.	25.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$23.50
No. 2 Heavy Melt. Steel	21.50
Nos. 1 & 2 Bundles	17.50
No. 3 Bundles	14.50
Machine Shop Turnings	11.00
Mixed Borings, Turnings	8.00
Punchings & Plate Scrap	32.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	23.50
Rails, Rerolling	39.50

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$30.00
No. 1 Bundles	30.00
Mechanical Bundles	28.00
Mixed Steel Scrap	28.00
Mixed Borings, Turnings	23.00
Rails, Remelting	30.00
Rails, Rerolling	33.00
Busheling	24.50
Bushelings new factory, prep'd	28.00
Bushelings new factory, unprep'd	23.00
Short Steel Turnings	23.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

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Sheets, Strip . . .

Sheet and Strip Prices, Page 123 & 124

Cleveland—Sheetmakers, hoping to become reasonably current on shipments in last quarter, are holding customers strictly to quotas. They are declining much additional business, and where military needs are involved buyers are asked to take the required tonnage from their current allotments if at all possible. Heavy carryover from third quarter will take at least one month's production in fourth quarter. With military demands rising some cutbacks from presently established allotments may be necessary. Considerable uncertainty exists because of the tentative character of shipment promises. Until some method of allocation to care for essential and emergency needs is approved by the government indications are the market will continue in a somewhat confused state.

Boston — Hot-rolled strip inventories with nonintegrated cold-rolled producers are becoming more unbalanced. Sold out through remainder of this year, converters are more frequently forced to revise rolling schedules with carryovers substantial for fourth quarter likely. Upturn in shoemaking is bolstering buying of shank steel. Until armament and marginal defense requirements are more definitely established, producers delay forward fourth quarter sheet scheduling. An increasing number of government contracts is being placed.

New York—District sales offices have received tentative quotas for fourth quarter, but they are holding up allotments for the entire period until they can better gage defense requirements.

District sellers are receiving a steadily increasing number of government orders. In some cases the government numbers are ignored for the reason they were issued through agencies that did not, in the opinion of sellers, have work that warranted special preference. However, numbers of importance result in prompt insertion of orders on mill schedules. In some instances orders are coming from relatively new companies that have never before purchased tonnage from the mills approached.

Philadelphia — With sheet mills blanking out from one to two months in the final quarter in an effort to become current on commitments and having generally allocated tonnage for the remainder of the period, consumers have a better idea as to where they stand than at any time in recent weeks. In some cases consumers report a little less pressure from buyers indicating that end-product consumption is leveling off.

Further orders for grain storage bins have resulted in cutbacks in galvanized sheet orders regarded of less importance to the economy of the country.

Pittsburgh—Sheet and strip consumers are having little success obtaining firm commitments from suppliers on first quarter production schedules. One producer of electrical apparatus has definite assurance of its first quarter silicon steel requirements. But the mills are reluctant to

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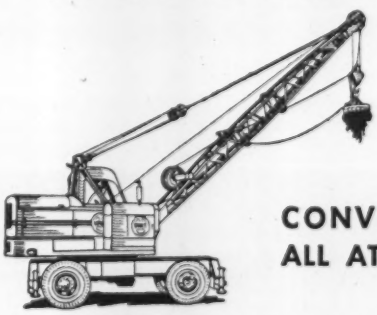

CONVERTIBLE TO ALL ATTACHMENTS

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make even tentative commitments beyond normal lead time. Relatively little "preferred" tonnage is scheduled for September delivery, mill allotments to regular consumer groups remaining largely intact.

Cincinnati—Sheet rolling holds at high level against peak demand. Mills are giving voluntary preference to military specifications and this tonnage is gradually increasing.

Chicago—Much government business involves flat-rolled products and the mills are losing ground on shipments to other customers. This is particularly true in galvanized sheets. Cold-rolled sheets for lockers, "blitz" cans and other items have been booked.

Attempts to get steel for inventory are failing in many cases, and while anticipatory buying would be widely practiced were it possible, consumers generally are satisfied if their quotas permit normal output. Gray market sheets are in big demand but supply is restricted and largely foreign material.

San Francisco—Producers are trimming allotments for fourth quarter. The frantic pace of demand shows no signs of slackening.

Tubular Goods . . .

Tubular Goods Prices, Page 126

Los Angeles—Seeking to replenish depleted above-ground oil stocks, the West Coast oil industry is hampered by tight supplies of pipe and casing. One company is able to get only 1700 tons of small-diameter pipe and casing of the 2500 tons it needs for first quarter. West Coast Pipeline Co. plans a 1100 mile, $66 million oil pipeline which will extend from Texas to this city.

Seattle — Cast iron pipe agencies report stocks greatly reduced the last 60 days with replacements slow at 120 days. Demand continues insistent. Bid calls as a rule involve alternatives.

Ferroalloys . . .

Ferroalloy Prices, Page 127

Washington—Production of silicon alloys dropped 24 per cent in the second quarter while shipments declined 39 per cent, reports Bureau of Mines. Production of all grades of silicon alloys, including silicon metal, totaled 181,183 tons compared with 239,445 tons in the first quarter. Of the second quarter output, 53,719 tons, or 30 per cent, was blast furnace silvery pig iron containing less than 13 per cent Si. Electric furnace ferrosilicon (containing 14 to 95 per cent Si) production totaled 113,730 tons, or 60 per cent. Balance of the production, or 13,734 tons, consisted of silicon metal, silicon briquets, and miscellaneous silicon alloys.

Shipments from producing plants amounted to 43,118 tons of blast furnace silvery pig iron, 77,777 tons of electric furnace ferrosilicon, and 10,545 tons of silicon alloys, or a total of 131,440 tons. Apparent consumption of silicon alloys declined 39 per cent from the first quarter and totaled 132,771 tons.

Wire . . .

Wire Prices, Page 125

Cleveland—Wiremakers are doing everything possible to equitably distribute available supplies but consumers and jobbers continue to press for shipments. Merchant trade demand is particularly insistent, efforts apparently being made to build inventories against expected severe shortages over coming months. Wiredrawers are scanning orders carefully, seeking to prevent speculative hoarding.

Boston — Allocations will apply to more wire products in fourth quarter and orders for that period are being booked subject to revision and displacement by armament volume. Orders are also more carefully screened with volume held to a point to eliminate excess tonnage.

Pittsburgh — Most sellers are booked through fourth quarter on manufacturers' and merchant wire products. Customers seek commitments into first quarter but mills have not opened books for that period. Unseasonal demand for fence continues. Pressure for nails is very strong. Nonintegrated wire producers' production schedules are retarded by scarcity of wire rods.

Chicago—Clamor for wire products continues. Farm requirements of bale ties and baling wire are far in excess of supply. Building type nails command substantial premiums in the gray market, and a lively trade is being done on the basis of $12 a keg for certain sizes. Welded fabric demand has increased.

Warehouse . . .

Warehouse Prices, Page 127

Philadelphia—In the local warehouse market, shapes have joined sheets, plates and bars as a highly scarce item. Despite considerable substitute buying, distributors question whether August business exceeded July's for the reason stocks generally were substantially reduced.

Cleveland—Mill shipments are inadequate to maintain warehouse stocks in balance. Heavy consumer demand over past weeks has depleted some distributors' inventories of certain products. As a result, sellers are forced to turn away considerable business. August order volume was heavy and would have been still larger were the warehouses able to accommodate all of the inquiries received. September business will be limited by stocks on hand and sellers' willingness to risk further inventory depletion on the chance mill shipments will improve.

Cincinnati—Consumers are shopping around in order to get warehouse steel. Stocks dwindle despite the turndown on tonnage inquiries from mill customers. Sales during August were well maintained but distributors are uncertain about future volume.

Los Angeles—Fabricators' requirements continue to rise. Inquiries in August were 50 per cent more numerous than in July. Steel shipments are limited by distributors' inventories.

San Francisco—Increasing inability of distributors to keep shelves filled has affected their volume. Demand is heavy, but unbalanced supplies restrict sales.

Seattle—Distributors have had a heavy turnover recently, but war hysteria has subsided. Stocks are down and replacements from eastern mills are slow.

Structural Shapes . . .

Structural Shape Prices, Page 123

Chicago — Supply of shapes is tightening. One factor is resumption by a few fabricators of the manufacture of Bailey bridges. Ceco Steel Products Corp. received a U. S. Engineers contract for an undisclosed number of these. Shipment will begin in December, with 15 per month scheduled. This number is 50 per cent greater than the company's turnout of these structures during World War II. Procurement of the steel is up to the company. Steel requirements for the order are 1500 tons a month, including that needed by subcontractors.

Inquiries totalling 5000 tons of structurals and plates for Bailey bridge construction have been received by one district mill. Scheduling of this steel will come on top of badly overloaded mill books for fourth quarter.

Fabricators' ingenuity is being taxed by the steel shortage. Designers are having to redesign contemplated structures to conform with the size shapes they have on hand. Some planned commercial construction is deferred.

Boston—Fabricated structural steel deliveries extend to April in some cases. Shops are more selective in estimating work with delivery rather than price a growing factor in placement of tonnage. More steel is coming out for direct bids. Short of plain material and concerned with outlook in covering against backlogs, shops are willing to pay higher prices if steel is available for wanted delivery. One mill charging 4.25c f.o.b. can put down plain material Boston at 4.80c compared wtih warehouse 5.95c. New tonnage up for estimates includes 1600 tons, pier, Boston, and 2000 tons, arch roof, transit shed, Providence, R. I.

New York—July structural steel bookings of 265,771 tons were a shade under the revised figure of 266,612 tons placed the preceding month, reports American Institute of Steel Construction. Total bookings in the first seven months were 1,306,144 tons, 58 per cent greater than in the like 1949 period.

Shipments dropped from a revised figure of 172,096 tons in June to 132,367 tons, due largely to plant vacations. Shipments for the first seven months were 1,068,678 tons, down 8 per cent from the corresponding period of 1949. Backlogs for fabrication through November increased substantially to 684,538 tons.

Contract figures have been revised for May and April to 192,319 and 155,011 tons, respectively. May shipments have been revised to 168,133 and April shipments to 164,440.

Los Angeles—Trade observers say higher costs can not stem this city's building boom. District building costs in July were estimated 9 per cent higher than in June, 14.3 per

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cent above the average for July last year.

San Francisco—Public works provide heaviest demand for structurals. Private industrial building is remaining steady but most projects are small.

Seattle—Structural fabricators report a 60-day order backlog, but supplies, particularly items purchased from eastern mills, are increasingly short. Allocations are inadequate. Projected construction in this area involves a large quantity of shapes.

Steel Bars . . .

Bar Prices, Page 123

New York—Increasing reshuffling of hot bar mill schedules is necessary as emergency work develops. Such tonnage still represents a small portion of the total on mill books for shipment this year. However, with commercial demands greater than supply, much of it accounting originally for the entire allotment of some mills for fourth quarter, the increasing volume of emergency requirements is resulting in readjustments. Moreover, most mills are overbooked on commercial work for the current quarter and consequently arrearages will have to be worked in over the closing months of the year. Cold drawn bar schedules are tight. In some cases sellers have accepted tonnage for January shipment.

Boston — Already filled through fourth quarter on carbon bars, mills are booking capacity on alloys into November. Forging shops are reflecting armament orders and backlogs in other metalworking industries are higher. Consumption of alloy steel percentage-wise is relatively high in New England and to date most alloy users have not been hurt, stainless excepted. Tool steels are still readily available.

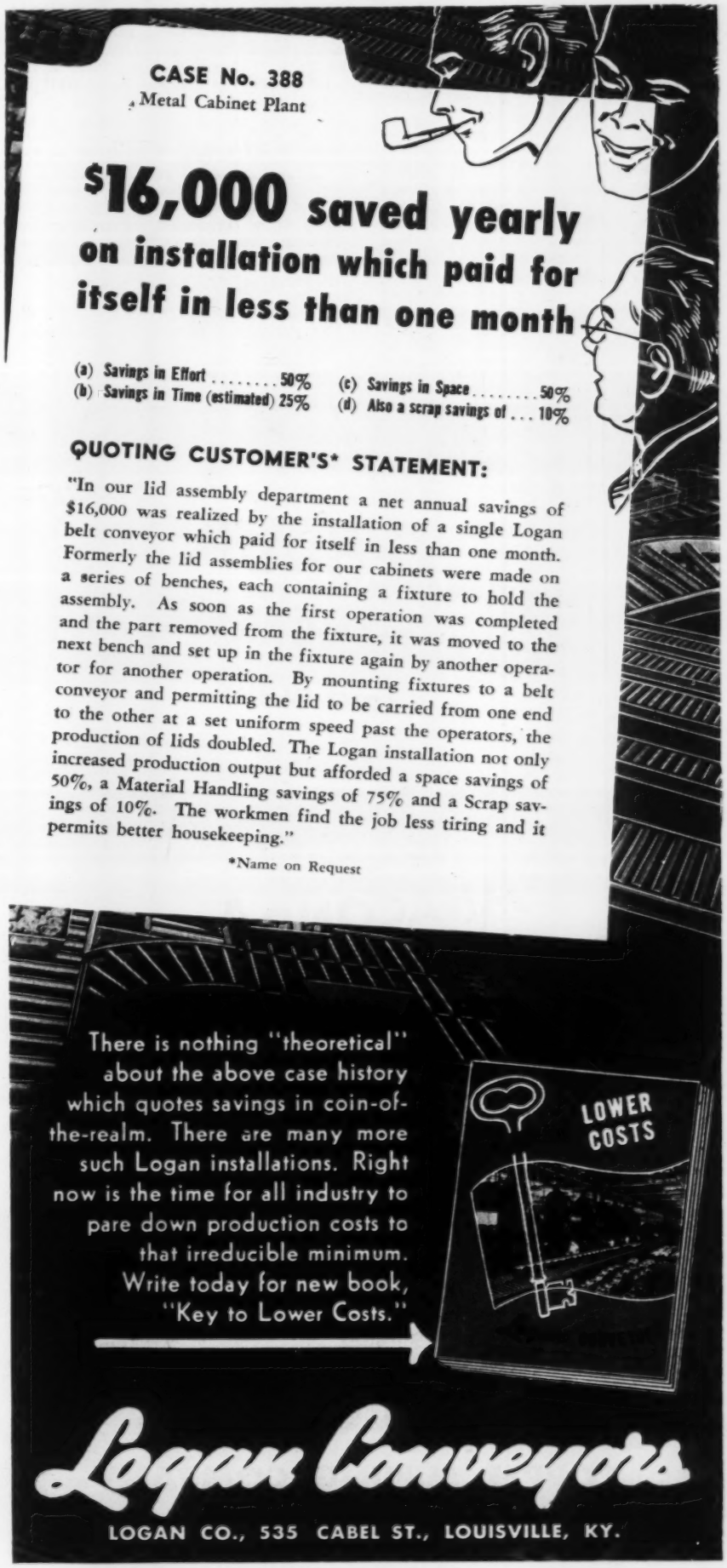
Philadelphia—Most bar sellers are completely sold out for remainder of the year on hot carbon bars, alloy bars and cold-drawn bars. Some cold drawers are not committing themselves beyond January. Frankford Arsenal has awarded a contract to Bethlehem Steel Co. for 247 tons of manganese molybdenum steel bars at $75,240.

Pittsburgh — Alloy bar producers are reviewing commitments and closely screening orders with a view to altering specifications where possible to those grades involving minimum amount of nickel. Some interests have sufficient nickel stocks for six weeks' production of normal product mix. However, nickel allotments may be further reduced this year necessitating production emphasis on 8600 series and other low nickel grades.

Producers also are concerned over supplies of molybdenum demand for which has sharply increased.

Sellers are expected to enter fourth quarter with three to four weeks carryover. Order acceptance in the period will be reduced to permit the mills to make up shipment deficit. Specifications for military needs are not expected to reach significant volume until late fourth quarter.

Cleveland—Merchant bar sellers, booked through remainder of the year,


CASE No. 388
Metal Cabinet Plant
$16,000 saved yearly
on installation which paid for itself in less than one month
(a) Savings in Effort 50%
(b) Savings in Time (estimated) 25%
(c) Savings in Space 50%
(d) Also a scrap savings of ... 10%
QUOTING CUSTOMER'S* STATEMENT:
"In our lid assembly department a net annual savings of $16,000 was realized by the installation of a single Logan belt conveyor which paid for itself in less than one month. Formerly the lid assemblies for our cabinets were made on a series of benches, each containing a fixture to hold the assembly. As soon as the first operation was completed and the part removed from the fixture, it was moved to the next bench and set up in the fixture again by another operator for another operation. By mounting fixtures to a belt conveyor and permitting the lid to be carried from one end to the other at a set uniform speed past the operators, the production of lids doubled. The Logan installation not only increased production output but afforded a space savings of 50%, a Material Handling savings of 75% and a Scrap savings of 10%. The workmen find the job less tiring and it permits better housekeeping."
*Name on Request
There is nothing "theoretical" about the above case history which quotes savings in coin-of-the-realm. There are many more such Logan installations. Right now is the time for all industry to pare down production costs to that irreducible minimum. Write today for new book, "Key to Lower Costs."
LOWER COSTS
Logan Conveyors
LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

are declining additional business, hoping to get order books in shape before fourth quarter ends. Carryover tonnage from third quarter will be heavy and consumers' receipts will depend upon extent military orders cut into available supply. Where possible, bar sellers are insisting customers cover military requirements from established allotments. However, considerable business arising on direct government account has to be inserted in mill rolling schedules. For example, one producer was in receipt of an order from the Atomic Energy Commission last week. Since this body has no regular allotment the required tonnage will have to be inserted in current schedules.

Los Angeles—Some indication of easing in demand for bars is noted. Current warehouse purchases of cold-drawn bars are reported down sharply. Demand continues active and heavy for carbon bars and polished shafting.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 123

Los Angeles—Reinforcing bar supplies have tightened. Producers are favoring regular customers, turning down requests for tonnage from new buyers.

San Francisco—Demand is heavy for current projects and stockpiling. Big apartment house construction may slacken soon but no let-up in consumer buying of bars is seen because of fear of continued shortages.

Seattle—Rolling mills have heavy bar backlogs and are operating at capacity. Small tonnages predominate and buyers insist on quick delivery. No military contracts of major importance are reported. Shipyards with reconidtioning jobs are buying merchant bars in larger volume and warehouses are replenishing stocks.

Plates . . .

Plate Prices, Page 123

Boston—Relatively little plate tonnage has been scheduled beyond October. Cutting deep into fourth quarter rollings will be freight car requirements. Tank shops and miscellaneous fabricators are successful in placing but a fraction of wanted volume which leans strongly toward lighter gages which are most extended or limited to arbitrary ratios per order. At least seven different delivered prices prevail, depending on mill location and f.o.b. quotation, but fabricators will pay highest price to get steel. Deliveries on pressed heads extend 22-24 weeks; medium spun, 9-10 weeks, and small spun, seven to eight.

New York—Some sellers, particularly for railroad car construction, have accepted fourth quarter commitments on the basis of what they had done under the voluntary allocation system set up early in the postwar period. Unless through some kind of allocation program approved by the government, which might call for still greater allotments, they plan to take nothing more.

Reports are current car builders would like to step up construction around end of the year to 12,500 cars per month, instead of a maximum of 10,000 cars. Steel producers oppose such an increase holding that while they could supply such an increase in requirements within the time indicated if necessary they doubt the car builders can build up their organizations rapidly enough to utilize the steel if it were made available.

Demand from tank fabricators is at highest level in months. Demand for field oil storage tanks is very active, requirements for light underground tanks are heavy and are expected to be maintained at the current level well into October. Chemical industry's tank requirements have undergone a sharp spurt.

Philadelphia—Stringency in plate supply is puzzling to many. To all practical purposes plate mills are out of the market. Only highly rated orders stand a chance of being worked into most schedules this year. Another exception in the overall situation applies to tonnage offered at high premiums or carrying substantial fabrication.

One factor in stringency is continued light production of strip plate. In 1943 strip plate production reached all-time peak of 5,666,946 tons. In that year total plate output amounted to 13,118,940 tons. Last year strip plate production was 879,128 tons, lightest in the postwar era, except in 1946 when such production had dropped sharply from the war-years to 515,575 tons. So far this year

ANACONDA
FERROMANGANESE
standard grade
ANACONDA
NODULIZED MANGANESE ORE
Manganese content approximately 59%
Anaconda's production is the principal U. S. source of supply for metallurgical grade manganese ore. Anaconda Copper Mining Company, 25 Broadway, New York 4, N. Y., and Anaconda, Montana.
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ANACONDA
COPPER MINING COMPANY

strip plate tonnage has shown little if any gain over 1949.

Worth Steel Co., Claymont, Del., has advanced prices on stainless clad plate 1 cent per lb for 10 per cent material and 1.50 cents for 20 per cent material, effective Aug. 28.

Cleveland—Rising railroad car requirements present an increasingly tough problem for plate sellers. Already booked to capacity for months into the future, the mills are being pressed by the carbuilders for sufficient steel to build more than 10,000 cars monthly. Diversion of steel to the carbuilders would be at the expense of other consumers. One district mill that withdrew from the plate market last April, now is clearing up orders accumulated last spring. As of the present, it has no intention of resuming plate production in this district, though it is likely it would do so upon government request.

Chicago—Huge unsatisfied demand for light gage plates is responsible for one district mill attempting to add a third shift on its mill. Regular customers are crying for an increase in allotments. Freight car builders are trying to cover themselves. Likelihood that allocations, when imposed, will take trial-and-error experience before finally proving satisfactory has interested parties highly dubious any such goal as 10,000 freight cars a month can be reached early next year. It is estimated any allocation scheme cannot be readied and in operation before November at earliest. Mills expect that quotas as set up now will not be too greatly revised. Influx of orders for Bailey bridges is beginning.

Seattle—Plate shops are handicapped by scarcity of plates and sheets and hesitate to bid on larger jobs involving considerable tonnage. Supplies are on allocation.

Stainless Steel . . .

Stainless Steel Prices, Page 126

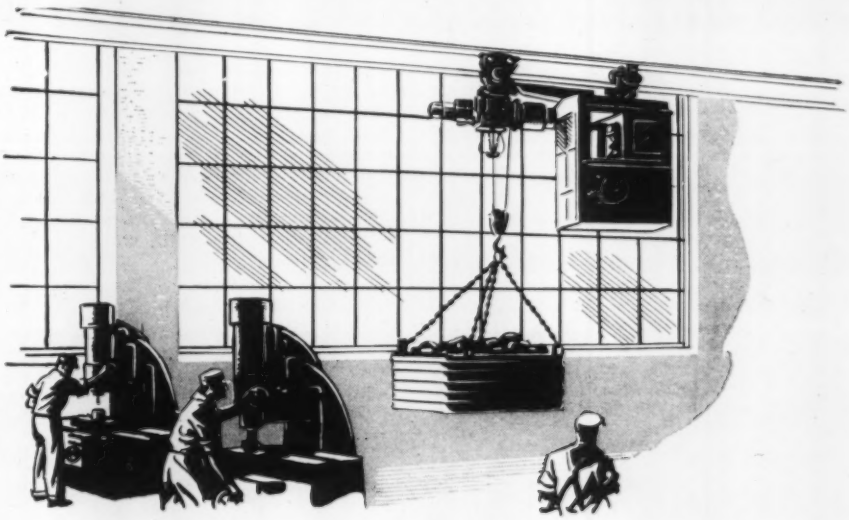
Pittsburgh—Jessop Steel Co., advanced stainless clad plate and sheet prices 1½ cents per lb on 20 per cent grades and 1 cent on 10 per cent, effective Aug. 26 at Claymont, Del., and Washington, Pa. This action is in line with upward price adjustments announced a week ago by Lukens Steel Co. Nickel shortage may retard stainless steel output for less essential uses later this year.

Chicago—Pickup in aircraft procurement is stimulating stainless steel demand. Bars and billets are required by forge shops in substantial volume while plates and sheets are moving in large tonnage. Miscellaneous uses account for heavy inquiry received by warehouses. Pressure on distributors is greatest in history for this product. Price advances, similar to those announced by Lukens on stainless clad plates, are reportedly in the wind with other producers.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 126

Pittsburgh—Supply of oven foundry coke is tighter with some foundries relying more heavily on beehive grades to sustain production schedules. Some oven foundry coke has been purchased from eastern produc-



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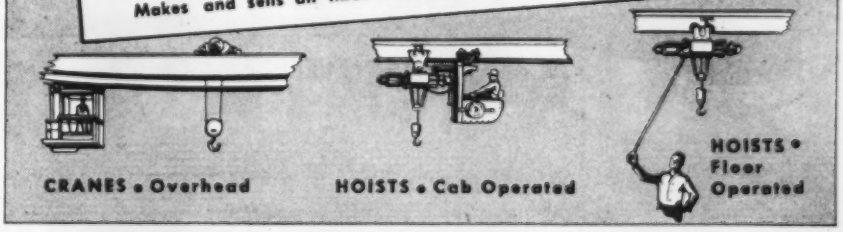

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ers. H. C. Frick Coke Co. plans to develop a new 4000-ton per day coal mine in Washington county, and another mine of the same capacity closed since 1928 will be reopened in Fayette county.

Pig Iron . . .

Pig Iron Prices, Page 122

Cleveland — Termination of the token strike on the railroad serving the local plant of Republic Steel Corp. permitted resumption of pig iron production at the plant's four stacks which had been banked. However, it was estimated at least a week would be required before prestrike production is attained, especially since trouble was experienced last midweek on No. 1 furnace. Loss of production will be sorely felt by the foundries since Republic is one of the chief merchant iron suppliers in this area.

Cincinnati—Rationing plan is in effect to spread available pig iron among regular furnace customers. Some current demand represents duplicated orders. The melt is expanding. Some foundries would be even more active if iron and coke were in sufficient supply.

Boston—Mystic furnace stepped up production in August and if output reached 13,000 tons, fourth quarter prices for foundry and malleable are likely to be revised on new basis of costs. Not since July, 1949, has the Everett furnace produced the minimum of 13,000 tons in one or two months required in any previous quarter on which to base average costs for pricing under the mutual partnership agreement with most district foundries. Price for foundry iron therefore has remained $50.50, Everett, although costs have increased since July, 1949. Melt is slightly higher for textile mill equipment and machine tools.

New York—Pig iron consumption is expected to be heavier this month than in August. Some trade interests predict September consumption will be the best so far this year.

Suppy of domestic iron will be tighter than in recent months due to anticipated betterment in demand and the fact shipments from Swedeland, Pa., will be off because of a furnace suspension for repairs.

Foreign prices are moving upward, some importers now quoting around $50 f.o.b. cars, eastern seaboard.

Buffalo—Coke shortage is more acute as a producer curtailed operations last week to make oven repairs. Efforts to locate other supply sources meet with little success. Demand for iron is considerably heavier. Many foundries are taking advantage of increased orders by asking for more iron than is necessary for immediate production.

Philadelphia—Larger of the two furnaces at Swedeland, Pa., is expected to be taken out of production for repairs shortly.

Offerings of foreign iron are heavier, but prices in some cases have reached the point where consumers are showing less interest. French producers are offering foundry iron at $50.90 metric ton c.i.f. plus 75 cents duty, and are offering basic and malleable at $52.65-$52.75 c.i.f.

Pittsburgh—Pittsburgh Metallurgical Co. advanced electric furnace silvery pig iron $6.50 per gross ton to $78, Niagara Falls, effective Aug. 23. The $3 per ton increase in merchant iron by Pittsburgh Coke & Chemical Co. earlier this summer has not been followed by other major producers.

Foundry pig iron distribution is under virtual allotment. Sellers are not making commitments for more than a month ahead. Captive and jobbing foundries have increased the proportion of scrap in melts. One has a large commitment of foreign iron. Basic iron also is in tight supply.

Refractories . . .

Refractories Prices, Page 127

Pittsburgh—Output of refractories is near capacity, reflecting continued heavy demand. Steel producers are increasing ingot capacity, enlarging open hearths simultaneously with relining programs. Refractory producing facilities are being increased in anticipation of heavier requirements.

Deliveries on clay brick are available from stock in most instances. General silica grades are promised in six to 12 weeks.

Recently basic brick prices were advanced, burned chrome being hiked $2 to $68 per net ton; chemical-bonded chrome $3 to $72; burned magnesite to $94, and chemical-bonded magnesite to $83.

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Scrap . . .

Scrap Prices, Page 130

Pittsburgh—Definite weakness in open-hearth scrap quotations developed last week as major mill consumers refused to pay more than $44 for No. 1 grades. At midweek a representative mill purchase was made at $44 representing a drop of $2 per ton from the last recognized price. Weakness in the market was evidenced by ability of brokers to make fairly large tonnage purchases within a range of $43.50 to $44, off $1.50 to $3 from recent highs. One mill turned down an offer of substantial tonnage of No. 1 heavy melting at $45 last week.

Indicative of mills' favorable stock position is a report major interests will not purchase dealer scrap for September delivery until after Labor Day. Another bearish factor on scrap quotations is the 150,000 tons of No. 1 heavy melting quality scrap from Germany and France, scheduled to be delivered to U. S. Steel Corp.'s subsidiaries here through remainder of this year.

Detroit—Brokers are inclined to go along with steel mills' efforts to stabilize the market. Some have old orders to cover at higher prices, however, and cannot immediately fall in line with a price which would put No. 1 bundles here at $37 against a current price of $41 and even higher.

Brokers may find it precarious to go either long or short of the market. Beyond that, scrap tonnage could move on "direct deals" from fabricators to mills at higher prices than the mills now say they will pay.

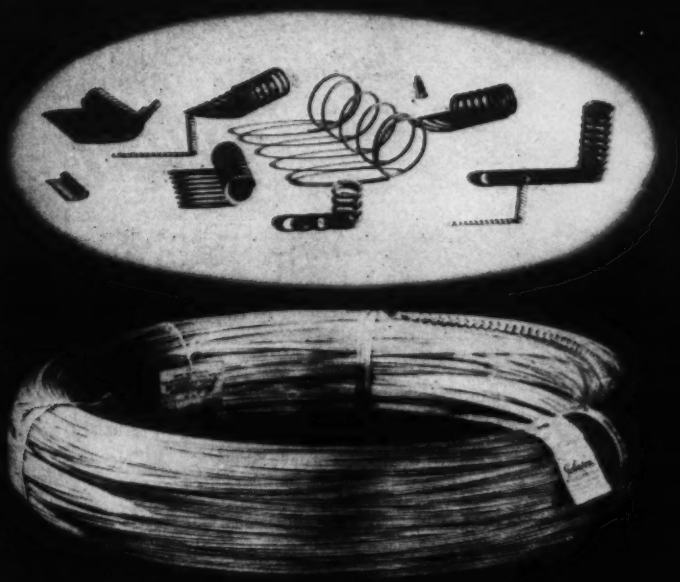
Cleveland—Dealers and brokers are hoping to stabilize the market at an equitable price basis for scrap. Responsible trade interests last week sold some tonnage on the basis of $43.50-$44 for No. 1 heavy melting steel, delivered to Pittsburgh and valley mills. The equivalent Cleveland price would be $41.50-$42, but the exact amount of springboard is uncertain. Some "sharpshooting" in the scrap trade is noted, but it has not been widespread. Foundry grades are strong pricewise.

Cincinnati—Scrap prices are unchanged in a confused market. Underlying strength and heavy potential demand tend to push quotations higher, but in contrast one district mill trimmed by $1 and more the prices it recently paid.

Boston—Reaction up to $1 per ton on some steel scrap grades followed halt in advancing prices and tonnage is coming out in better volume. No. 1 heavy melting slipped to $32.50 to $33.00 shipping point with No. 1 bundles and busheling slightly lower. Cast is slightly more active and with firm undertone.

New York—Brokers' buying prices for No. 1 heavy melting steel and No. 1 bundles have dropped to $33-$34, f.o.b. shipping point. New buying prices may be subject to some test, as not all brokers are confident that they are going to be able to acquire adequate tonnage at these lower prices.

Philadelphia — Easing at Pittsburgh is reflected in a reduction on No. 1 heavy melting in this district to $38-$39, delivered. Prices on No.



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Johnson XLO Music Spring Wire means—uniform cast, uniform tensile, uniform size and self-lubricating surface.—*The reliability of your springs begins with the wire.*

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1 bundles declined to a similar spread. Other leading open-hearth grades are firm. Low phos scrap is higher at $46 for electric furnace grade and $45 for 5 foot and under. Electric furnace bundles are easier at $40-$41. Cast grades are unchanged.

Buffalo—Dealers and top mill buyers are unable to agree on scrap prices. Although local prices appear in line with those quoted in other steel-producing centers, buying interest is at a low ebb. Dealers are avoiding piling material in their yards, and shipping against old orders. Tonnage records likely will be smashed by this year's receipts of scrap by water.

Chicago — Brokers' buying prices have been upped 50 cents on Nos. 1 and 2 heavy melting steel and No. 1 bundles. Buying to cover old orders continues, many traders taking a $3 loss on transactions. There is somewhat less zip to the market in open-hearth grades, although the shortage of No. 1 material is severe. Strongest showing last week was in turnings and borings which advanced a full $5 on basis of actual purchases. Rails are up about $3.

St. Louis—Rush of scrap consumers, paced by foundries, to lay in fall supplies sent prices last week on the sharpest climb in recent years. Paradoxically, No. 2 heavy melting steel, normally the big mill item in this area, was one of the few quotations unchanged. That has been on a moderate uptrend for several weeks. No. 1 steel edged up $2 at $40 as mills turned to better quality. No. 1 cupola cast was quoted up $5 at $45, while railroad malleable was posted up $8 from $53 a week earlier.

Seattle—Steel scrap is arriving in larger volume, although buyers indicate a tendency to hold back in hope of higher prices. No shipments from British Columbia are being received. Canadian exports are prohibited. Prices are unchanged. Cast iron scrap is firm at $30-$35; foundries report supplies are tight, but adequate for current operations.

Manganese Ore . . .

Washington—Imports of manganese ore increased 22.7 per cent in the second quarter to 335,865 tons from 273,666 tons in the first quarter, reports Bureau of Mines. India, Union of South Africa, Gold Coast, and Brazil were the principal sources. Domestic shipments of manganese ore in the second quarter more than doubled those of the first quarter due to the usual seasonal increase, totaling 31,600 tons and 13,700 tons, respectively. Mine stocks reached a new postwar low of 6681 tons at the end of June.

Canada . . .

Toronto, Ont. — Primary iron and steel shapes produced in Canada in May amounted to 381,058 net tons, compared with 325,448 tons in April. Shipments for sale in May amounted to 248,791 net tons against April shipments of 216,723 net tons and May, 1949 shipments of 231,921 tons.

Of shipments in May, 48,499 tons went to railways and car shops; 14,467 tons to pressing, forming and

stamping plants; 30,856 tons to merchant trade products, 35,592 tons to building construction; 22,349 tons to the containers industry; 10,264 tons to agricultural equipment; 17,500 tons to the automotive industry; 8707 tons to machinery plants; 3948 tons to shipbuilding; 15,461 tons to mining, lumbering, etc., and 1,253 tons miscellaneous industries; wholesalers and warehousing accounted for 24,680 tons and exports for 13,615 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3200 tons, buildings, veterans' hospital, Oklahoma City, Okla., to Virginia Bridge Co., Roanoke, Va.; Robert E. McKee, Dallas, general contractor.

1735 tons, Van Wyck state highway, 50-3, Queens, New York, to Harris Structural Steel Co., that city.

1500 tons, No. 42, New Jersey turnpike, Newark, through H. L. Harris & Sons Inc., Westfield, N. J., to Harris Structural Steel Co., New York.

625 tons, chemical plant, Mathieson Hydrocarbon Chemical Corp., Doe Run, near Brandenburg, Ky., to Bethlehem Steel Co.; Stone & Webster Engineering Corp., Boston, engineers and contractor.

200 tons, Oregon state bridge over Rogue river, to Poole, McGonigle & Dick, Portland, Oreg.; Tom Lillebo general contractor.

200 tons, apartment, Broadway and 51st avenue, Queens, N. Y., to Grand Iron Works Inc., New York.

175 tons, billet steel counterweights, bascule bridge, Grand Isle-North Hero, Vt., to Carnegie-Illinois Steel Corp., Pittsburgh; Lambert Construction Co., White River Junction, Vt., general contractor; 170 tons, steel punchings, same supplier, 55 tons, reinforcing bars to U. S. Steel Supply Co., Boston. American Bridge Co., Pittsburgh to fabricate 460 tons, structural steel.

150 tons, administration building, Nut Island sewage treatment plant, Quincy, Mass., to Groisser & Shlager Iron Works, Boston; Rich Bros. Construction Co., Boston, general contractor; Truscon Steel Co., Boston, will supply reinforcing steel.

100 tons or more, addition, Webber Hospital, Biddeford, Me., to Groisser & Shlager Iron Works, Boston; Brown Construction Co., Portland, Me., general contractor; Bancroft & Martin Rolling Mills Co. to supply reinforcing bars.

100 tons or more, junior high school, South Portland, Me., to Mequier & Jones Co., Portland; Consolidated Construction Co., Portland, general contractor. Bancroft & Martin Rolling Mills Co. to supply reinforcing steel.

100 tons, bridge, Pleasant avenue crossing, Scarboro, Me. (82) American Bridge Co., Pittsburgh; (18) bars, Bancroft & Martin Rolling Mills Co., Portland; P. E. Susi & Co., Pittsfield, Me., general contractor.

Unstated tonnage, veterans' housing project, Roslindale district, Boston, to Builders Iron Works, Somerville, Mass.; Jefferson Construction Co., Cambridge, Mass., general contractor.

STRUCTURAL STEEL PENDING

3600 tons, galvanized towers for 230-kv transmission line; bids to Seattle light department, Aug. 30.

1600 tons, pier No. 1, East Boston; bids Sept. 21, part of Boston Authority; 5700 tons, 14-inch steel pipe also required.

1350 tons, bridge superstructures, relocation, Chicago, Burlington & Quincy tracks, Trenton, Nebr., dam; American Bridge Co., Pittsburgh, low $541,305; bids to Bureau of Reclamation, Denver.

650 tons, New England Deaconess Hospital, Boston; bids in on general contract.

600 tons, Camp Curtin junior high school, Harrisburg, Pa.; pending.

560 tons, No. 56, New Jersey turnpike, Hudson county; George M. Brewster & Son Inc., Bogota, N. J., low on general contract.

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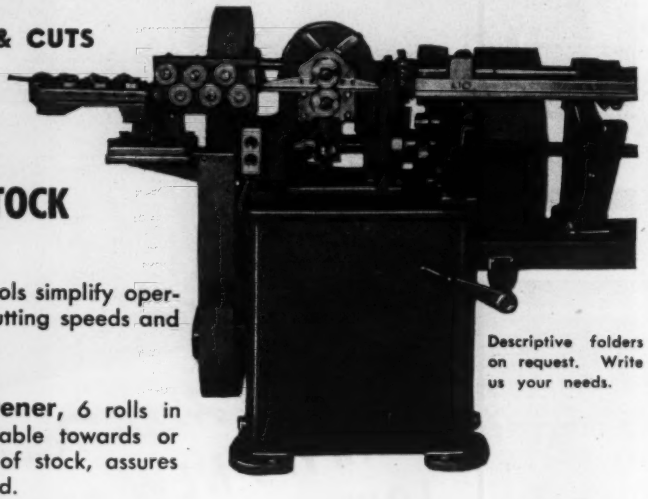

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260 tons, rotary reconstruction, including steel stringer bridge, Gaspee street-Pershing Sq. rotary, Providence, R. I.; bids Sept. 6, Providence.

225 tons, switchyard, Buggs Island reservoir project; bids Sept. 19, Corps of Engineers, Norfolk, Va.

200 tons, arch roof, transit shed, municipal wharf, Providence, R. I.; bids Sept. 5.

175 tons, three-span WF beam bridge and approaches, Sudbury, Vt.; bids in Sept. 1, Montpelier.

145 tons, interlocking steel piling, Ellensberg, Wash.; bids Sept. 6, Bonneville Power Administration, Portland, Oreg.

120 tons, state bridge work, Somerset county, Pennsylvania; bids Sept. 15.

100 tons, bridge, Storrow Memorial Embankment, Charlesgate West to Soldiers' Field Road, Boston; bids in.

Unstated, international airport hangar; bids to Civil Aeronautics Administration, Anchorage, Alaska, Sept. 13.

Unstated, Idaho-Oregon state bridge over Snake river, Weiser, Idaho; bids soon to Walter Albrethsen, highway engineer, Boise, Idaho.

Unstated, nose hangars, McChord Field, Washington; Mowat Bros., Seattle, low, $413,180.

Unstated, addition to United Air Line hangar, Bow Lake airport, near Seattle; bids soon.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, buildings, veterans' hospital, Oklahoma City, Okla., to Capitol Steel Co., Oklahoma City, Okla.; Robert E. McKee, Dallas, general contractor.

450 tons, Frigidaire Division, General Motors Corp., Dayton, O., to United States Steel Supply Co., Chicago.

310 tons, including concrete piling, Washington state Duvall bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; State Construction Co., Seattle, general contractor.

250 tons, Society for Aid to Lutherans, Appleton, Wis., to United States Steel Supply Co., Chicago.

190 tons, bridge, Acadia National Park, Maine, to Truscon Steel Co., Boston; M. & M. Construction Co., Bar Harbor, Me., general contractor.

175 tons, state highway and bridge, Bolton, Conn., to Bethlehem Steel Co.; D. Arrigoni, Middletown, Conn., general contractor; 50 tons structural steel awarded same fabricator.

160 tons, Junior high school No. 125, Bronx, New York, through Joseph Weinstein Inc., Brooklyn, N. Y., general contractor, to Jones & Laughlin Steel Corp., Pittsburgh.

125 tons, Rockaway Beach interceptor sewage, contract No. 5, Department of Public Works, New York, to Jones & Laughlin Steel Corp., Pittsburgh.

115 tons, roadways and connections to Harvard bridge, Boston; Coleman Bros. Corp., Boston, general contractor.

100 tons, or more, municipal bus terminal and parking facilities, Bridgeport, Conn., to Ceco Steel Products Co., New York; Frouge Construction Co., Bridgeport, general contractor; American Bridge Co., Pittsburgh, to fabricate 550 tons, structural steel.

REINFORCING BARS PENDING

995 tons, National Biscuit Co., Chicago; bids asked.

485 tons, men's dormitory, Purdue University, W. Lafayette, Ind.; bids asked.

400 tons, No. 42, New Jersey turnpike, Newark; H. L. Harrison & Sons Inc., Westfield, N. J., awarded general contract.

350 tons, No. 49, New Jersey turnpike, Hudson county; bids Sept. 7.

225 tons, mostly mesh, state highway, Lincoln, R. I.; bids Sept. 6, Providence.

209 tons, state bridge work, Allegheny and Butler counties, Pennsylvania; bids Sept. 15.

200 tons, city of Minneapolis; bids asked.

185 tons, docks, Nickel Plate Development Co., Cleveland; bids asked.

125 tons, Washington state Okanogan county bridge; bids to Olympia, Sept. 7.

UNIVERSITY OF MICHIGAN LIBRARIES

100 tons, School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh; bids asked.

Unstated, high school and civic auditorium, Idaho Falls, Idaho; Arrington Construction Co., low $915,200 and $485,800 respectively.

Unstated, Seattle Historical Museum building; bids to 330 Henry Bldg., Seattle Sept. 12.

PIPE . . .

CAST IRON PIPE PLACED

100 tons, 12 and 8 inch, Shelton, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

PLATES . . .

PLATES PENDING

100 tons, elevated water tank, Florence, Oreg.; Pittsburgh-DesMoines Steel Co., Pittsburgh, low $34,610.

100 tons, 2500 feet, 26 inch water supply line; bids to Hoquiam, Wash., Aug. 28.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Erie, 57 diesel-electric locomotives, placed as follows: Fourteen 2250-hp passenger units, four 1500-hp road switchers, three 1500-hp freight units and one 1000-hp yard switcher, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; six 1500-hp road switchers and two 1000-hp yard switchers, to Baldwin Locomotive Works, Eddystone, Pa; and ten 1500-hp road switchers, eight 1500-hp road freight units, six 1500-hp passenger units, two 2250-hp units and one 1000-hp yard switcher to the American Locomotive-General Electric Companies, Schenectady, N. Y.

RAILROAD CARS PLACED

Missouri Pacific, 800 freight cars, to its DeSoto, Mo., shops; list comprises 300 seventy-ton gondolas, 250 fifty-ton box cars, 200 seventy-ton covered hopper cars and 50 fifty-ton pulp wood cars.

Northwestern Refrigerator Line Co., repairs to 125 refrigerator cars, to Greenville Steel Car Co., Greenville, Pa.

Spokane International, 75 flat cars, to American Car & Foundry Co., New York.

Western Maryland, 700 freight cars, 410 going to Bethlehem Steel Co.; 40 seventy-ton flat cars to the company's own shops; 100 seventy-ton covered hopper cars to American Car & Foundry Co., New York; 100 fifty-ton box to the Greenville Steel Car Co., Greenville, Pa.; 50 fifty-ton box cars to Pressed Steel Car Co., Pittsburgh; also 120 all-steel containers, 12 to the car, to Youngstown Steel Door Co., Cleveland.

FERROALLOYS

(*Continued from Page* 127)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

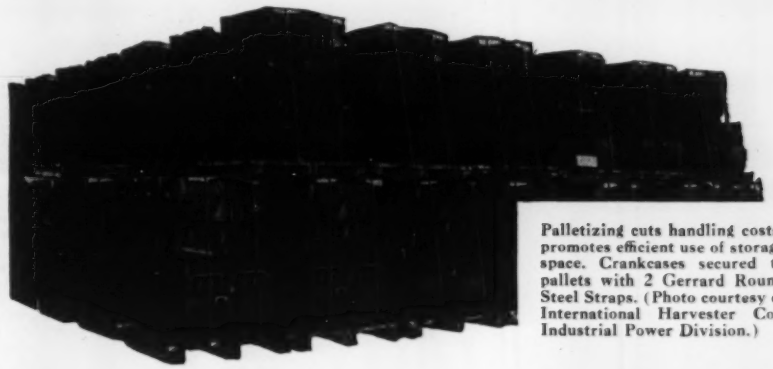
Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34.41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon, F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium,



Palletizing cuts handling costs, promotes efficient use of storage space. Crankcases secured to pallets with 2 Gerrard Round Steel Straps. (Photo courtesy of International Harvester Co., Industrial Power Division.)

Tie it tight...that means GERRARD!

Tight as tight can be... that's the kind of tie you get when you use the Gerrard method of strapping. Gerrard Steel Strapping is *round* . . . that's why it clinches evenly at the corners and distributes the stress evenly through its diameter. Danger of breakage . . . and damage claims, too . . . are sharply reduced. Individual packages and palletized units remain firm from plant to destination.

Gerrard Machines and Strapping, in a wide range of sizes, can be used to tie small parcel post packages, heavy pallets or carload lots of steel pipe, plate and tinplate.

And Gerrard Round Steel Strapping costs about 40% less than any other metal reinforcement.

Write for a *free* copy of *Blue Book of Packaging*. And consult a Gerrard engineer about your packaging problems. His services are available free of charge.

Gerrard Steel Strapping Company,
4745 South Richmond Street,
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UNITED STATES STEEL

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Welding shops equipped with Ruemelin Fume Collectors are assured of a clean shop atmosphere. Noxious fumes, heat and smoke are eliminated at their source, thus improving working conditions, lessening fatigue and paving the way for increased plant production.

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ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lot 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c per lb; No. 6, 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.0c per lb of alloy; ton lots 18.0c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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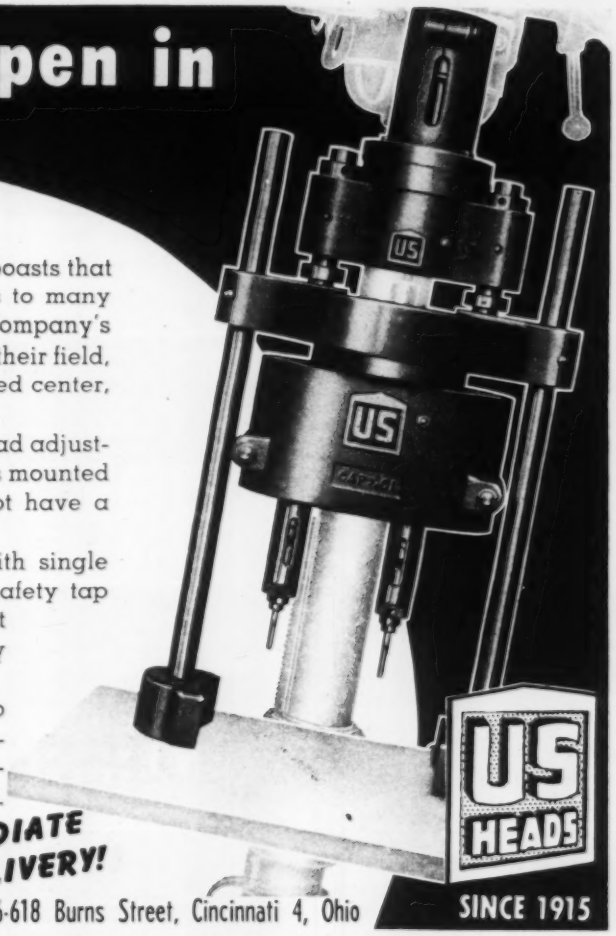

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The photograph at the right, is a U. S. Drill Head adjustable head, available in 56 sizes and 5 types. It is mounted on a tapping unit for a machine that does not have a reversing spindle.

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By locking the tapping unit the complete setup can be used for drilling also. Compactly designed, this heavy-duty tool is adaptable to any drilling machine, round quill, or flange type spindle.

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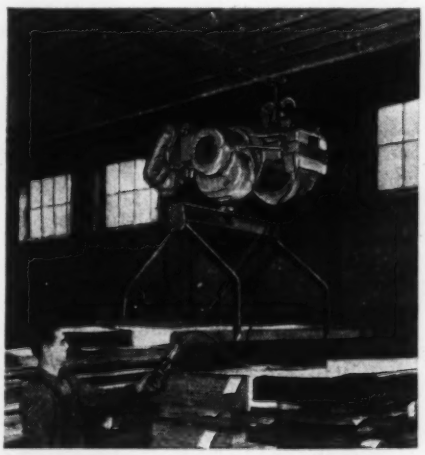

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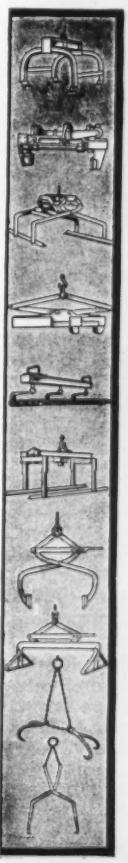

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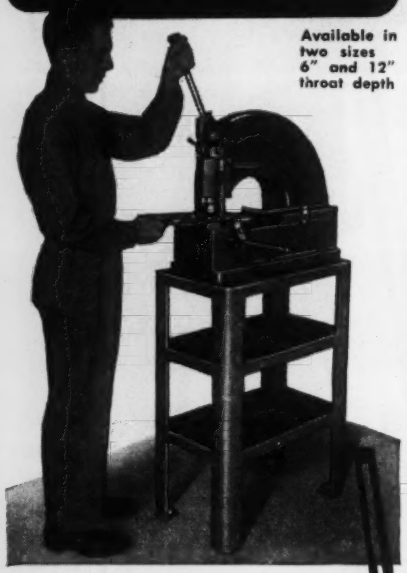

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

Paul D. Hammacher, Washington, reported contract has been let to J. A. Utley Co., Detroit, for a $40 million newsprint and kraft paper board mill near Butler, Ala. L. Morris Mitchell Inc., New York, is the engineer.

California

Swift & Co., Chicago, soon will start work on a processing plant at South San Francisco. The six-story structure will cost about $400,000 and is expected to be completed in six months.

California

Leslie Salt Co., San Francisco, is planning a $400,000 plant at Redwood City, about 25 miles south of San Francisco. The project will include four buildings, conveyors and a 40-foot crane tower for loading purposes.

California

Modern Plating Co., Los Angeles, started construction of a plant at the Los Angeles International Airport industrial tract, that city. Facilities for all types of metal plating for the aircraft industry, now located at the present location in Inglewood, Calif., will be moved to the new plant, scheduled for occupancy Dec. 15.

California

Santa Fe Tank & Tower Co., Los Angeles, initiated a series of nationwide engineering forums to acquaint industry with the latest concepts of cooling tower design, construction and operation. Meetings will be held in San Francisco, Houston, Dallas, Chicago, Tulsa, Okla., Phoenix, Ariz., and El Paso, Tex. Transcripts of these forums may be had by addressing the company at 5401 S. Boyle Ave., Los Angeles 11.

California

Corporation papers were filed in Los Angeles for **Southern California Monorail & Transit System** with an initial stock of $100,000. Incorporators propose to construct a monorail transportation line to connect San Fernando Valley with downtown Los Angeles. The line would comprise an overhead carrier rail which would support passenger cars of an undescribed pattern. Incorporators include: Gen. Walter R. Peck, U. S. A. (Ret.), Sherman Oaks, Calif; C. R. Van Scoy, Van Nuys, Calif.; Joseph O. Donovan, Claire S. Newberry and Jim Wilson, Los Angeles.

California

Chiksan Co., Brea, Calif., appointed Clifford B. Ives & Co., Narberth, Pa., and Rhodes Controls Co., Baltimore, as representatives in their respective districts for Chiksan ball-bearing swivel joints, mud guns, etc.

Connecticut

Manning - Maxwell & Moore Inc., manufacturers of gages, valves and industrial controls, plans an extension to its manufacturing and office facilities in Stratford, Conn. When the expansion program is completed, executive offices will be moved from New York city to Stratford.

Delaware

Metal Powders Inc. was chartered by the corporation department, secretary of state's office, Dover, Del. Capital of the firm is listed at $110,000. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Florida

International Minerals & Chemical Corp., Chicago, plans to build an office building in Bartow, Fla.

Georgia

Minnesota Mining & Mfg. Co., St. Paul, plans two buildings for warehouse and sales office space in Atlanta. Stevens & Wilkinson, that city, are the architects.

Idaho

Idaho Power Co., Boise, Idaho, plans to build a $18.5 million power plant on the Snake river, near Mountain dam.

Illinois

Blockson Chemical Co., Joliet, Ill., awarded the general contract for an addition to its local plant to E. H. Swensen, 14 Henderson St., that city. The expansion will cost about $225,000 and will include silos and miscellaneous structures.

Indiana

Plant of **Osgood Industries,** Osgood, Ind., suffered a $750,000 fire loss Aug. 14. Precision parts and lathes were produced in the plant.

Kentucky

General Electric Co., Schenectady, N. Y., plans a $2 million expansion of its radio and television receiving tube plant in Owensboro, Ky.

Massachusetts

Platt Contracting Co., Cambridge, is constructing the Sloan Metal Processing Laboratory for **Massachusetts Institute of Technology,** that city. It is designed to house a pioneering program of education and research in metallurgical science as applied to basic manufacturing processes. The building, provided by a gift of $1 million from Alfred P. Sloan Jr., chairman, General Motors Corp., is scheduled for completion in the fall of 1951. Architects for the structure are Perry, Shaw and Hepburn, Kehoe and Dean of Boston.

Missouri

General Metal Products Co., St. Louis, awarded the general contract for a $110,000 factory addition to Gamble Construction Co., that city. Fred R. Nauman, St. Louis, is the architect.

Missouri

H. & H. Machine & Motor Parts Co., St. Louis, will build a two-story building. Plans were prepared by Wischmeyer & Lorenz, that city.

Missouri

McDonnell Aircraft Corp., St. Louis, is contemplating the possibility of erecting a $2.5 million addition to its plant in that city.

Missouri

Behr-Manning Corp., Troy, N. Y.,—industrial and commercial abrasives and related products—awarded the general contract for a $100,000 plant in St. Louis to Jones-Kissner Construction Co., that city.

Missouri

Washington University, St. Louis, awarded the general contract for the $1 million Louderman Hall chemistry research building to Gamble Con-

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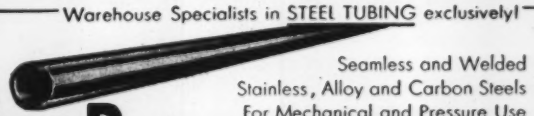

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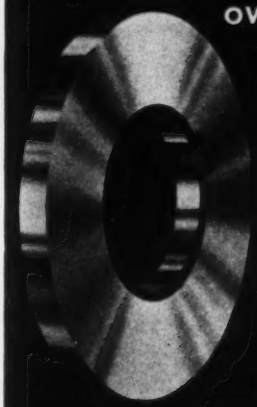

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